MASS.
ECD1.2:
M38

UMASS/AMHERST
312066 0374 5511 9

APR 8 2003
University of Massachusetts
Depository Copy

Massachusetts

toward a new prosperity

building regional competitiveness across the commonwealth



www.mass.gov/econ/newprosperity

GOVERMENT DOCUMENTS
COLLECTION

APR 2 8 2003

University of Massachusetts
Depository Copy

Jane Swift, Governor
Commonwealth of Massachusetts

Office of the Governor
State House
Boston, MA 02133
617/727.3600

Elizabeth Ames, Director
Department of Economic Development

John G. Troast Jr, Director of Policy
Department of Economic Development

Department of Economic Development
One Ashburton Place,
Room 2101
Boston, MA 02108
617/727.8380



With economic research and technical assistance from the University of Massachusetts

William Bulger, President
University of Massachusetts

J. Lynn Griesemer, Ed.D., Executive
Director UMass Donahue Institute

Michael D. Goodman, Ph.D., Director
of Economic Research and Analysis
UMass Donahue Institute

University of Massachusetts
President's Office
One Beacon Street
Boston, MA 02108
617/287.7000

chapter 1

choosing to compete:

to support knowledge-based

Massachusetts has undergone a profound economic transition over the past twenty years. Our old manufacturing base steadily lost much of its competitive edge. By necessity as much as by choice, we adapted to the "New Economy" of knowledge-intensive production, high-tech innovation, and global trading. Massachusetts had long been a center of science and technology. Only over the last two decades, however, has knowledge-based innovation become the foundation of our overall economic well-being.[1]

In recent years, there has been much discussion of the "New Economy." Recent experience shows that it is not simply about Internet startups, which flourished in the late 1990s but failed in the early years of the new century. Rather, the "New Economy" is about consistent and fundamental changes that have permanently altered the way in which wealth is created. Rapidly advancing technologies are transforming industries, firms, and the nature of work. In this environment, ideas and knowledge increasingly determine competitive advantage and we are still adapting to these changes. Markets and competition are increasingly global in scope. As such, the transition to the "New Economy" has implications for industry, our workforce, and government.

Today, Massachusetts is widely acknowledged as a leader in the new, knowledge-based economy.[2] This orientation, however, raises a new set of challenges for the Commonwealth. Our State economy has been quite volatile, and not all regions and citizens have adapted successfully. Continued progress requires well-targeted educational and infrastructure investments and a more active role for State government in the economic development process.

This Report proposes strategic priorities and policy options that are designed to promote and inform a healthy debate around the economic future of the Commonwealth and its regions. It highlights a strategic framework – supported by data and information – that can be used by public and private sector leaders to develop policies that target limited resources to areas of greatest need.

Our intent is to spark a spirited and constructive conversation on the role of State government and key priorities going forward.

---

[1] Lynn E. Browne and Steven Sass, "The Transition from a Mill-based to a Knowledge-based Economy: New England, 1940-2000," Peter Temin, ed., *Engines of Enterprise: An Economic History of New England.* (Cambridge: Harvard University Press, 2000).

[2] Three organizations placed the Commonwealth at the top of their most recent "New Economy Index" –the Progressive Policy Institute for 1999, the Meta Group for 2000, and the Milken Institute for 2001. See the Progressive Policy Institute Web site, http://neweconomyindex.org/States/massachusetts.html, the Meta Group, *Metricnet States New E-Economy Index 2000* (Stamford CT, 2001), and Milken Institute Web site, http://www.milkeninstitute.org/poe.cfm?point=ecoindex.

The Great Transition

Since the Industrial Revolution of the early nineteenth century, Massachusetts earned its keep by selling manufactured goods to the U.S. market. Blue-collar workers, in multi-story brick factories, in industrial cities and towns found in nearly every corner of the Commonwealth, generated the bulk of the income flowing into the State. This manufacturing economy grew up along rushing streams once needed for power. It extended along rail lines connecting its mills and machine shops to the national market. As recently as 1984, manufacturing establishments employed 675,000 workers, about 24 percent of our workforce. Manufacturing, however, has since shed over 250,000 jobs and now accounts for just under 13 percent of employment in the Commonwealth.[3]

As manufacturing receded, a new knowledge-based economy emerged. The services sector, which includes universities, hospitals, software developers, and management consulting firms (among many other enterprises) added 470,000 jobs since 1984 and jumped from 26 to 37 percent of total employment. Finance, insurance, and real estate, which includes money managers, mutual fund distributors, and venture capitalists added 50,000 jobs and went from 6.3 to 6.9 percent of employment (see Figure 1-1). Even in manufacturing, our workforce has changed. Many Massachusetts firms have automated, eliminated, or outsourced a great deal of shop-floor production and now employ, proportionately, far more managers, engineers, and technicians.[4]

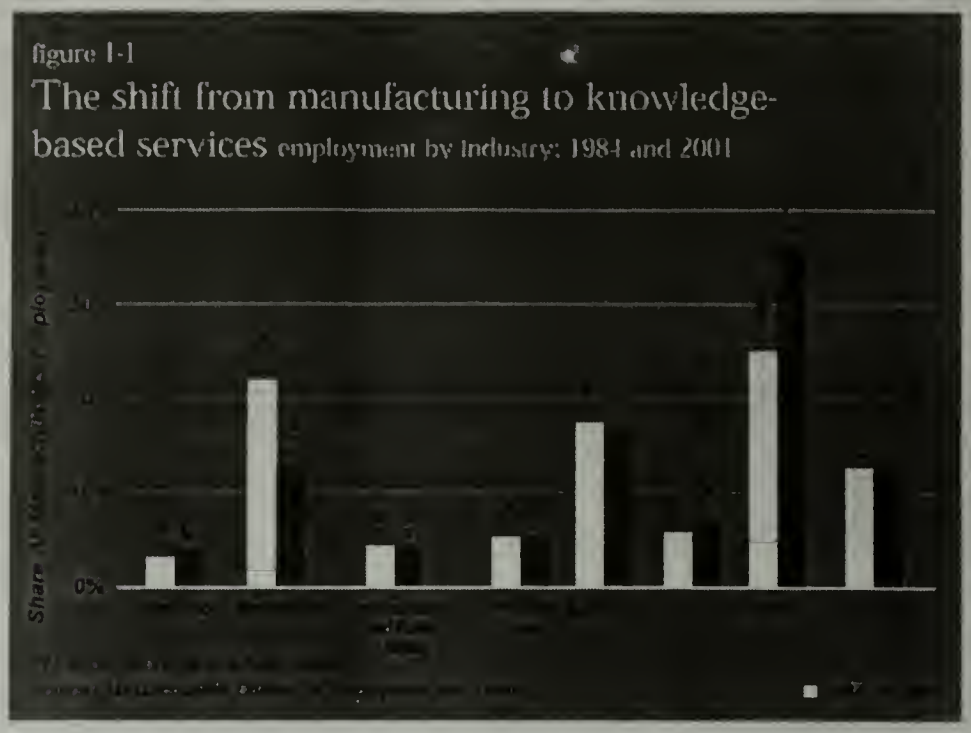
A new "built" landscape has emerged to accommodate this expansion of the knowledge-based economy. Modern office towers, R&D facilities, and up-scale housing developments and retail malls have superceded the red brick factory buildings, commercial blocks, and wood-frame three-deckers. Rather than locate in our smaller industrial cities and towns scattered across the Commonwealth, these new buildings sprang up in downtown metropolitan areas – primarily in Boston, and along our major highways – where people and ideas can move rapidly from one place to another.

Such a profound transition inevitably has far-reaching implications for the role of State government. It took a major economic downturn, however, for these new responsibilities to come clearly into focus.

That downturn began at the end of 1989, and ran through the early years of the 1990s. The crash of a speculative real estate and construction boom, fueled by the need to build-out space for the new knowledge-based economy, was the initial blow. It led to the collapse of one of our largest banks and a credit crunch that seriously impaired our ability to regroup. More fundamental were the sharp declines in output and employment in defense and computers – the two leading manufacturing industries through much of

figure 1-1

The shift from manufacturing to knowledge-based services employment by industry: 1984 and 2001



the post-World War II era. When combined with the effects of the relatively mild 1990-91 national recession, eleven percent of all jobs in the Commonwealth disappeared between 1989 and 1992[5] (see figure 1-2 on next page).

The most powerful shock came from the rapid decline of the Massachusetts computer industry. In time, the national recession and the local crisis in real estate and banking would pass. Our problems in defense reflected a nationwide cut in military spending that came with the end of the Cold War. But the troubles in computers were different. Here we lost a decisive head-to-head competitive struggle with Silicon Valley. The PC, developed by Intel, Microsoft, Apple, and other Silicon Valley firms, clearly stole the thunder from the Commonwealth's vaunted minicomputer manufacturers.

AnnaLee Saxenian and her influential book, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*,[6] expressed a widely held anxiety that this defeat reflected a significant competitive flaw. The underlying fear was that high-tech flourished far better in California's fluid, open culture with its abundance of small inter-networked firms, than in traditional and hierarchical Massachusetts corporations. In high-tech markets, the winner generally captures the bulk of the profits. So Saxenian argued that the Commonwealth would forever lag this younger and hipper rival. And by the early 1990s, high-tech business confidence in the future of the Massachusetts economy had all but vanished (See Figure 1-3 on next page.)

---

[3] Massachusetts Division of Employment and Training. http://www.detma.org/lmi/dataprog.htm.

[4] Ibid.

[5] Ibid.

[6] (Cambridge: Harvard University Press. 1994).

In the midst of this transition, the recession of the early 1990s sent a shockwave through the Commonwealth:

figure 1-2
Employment fell rapidly...

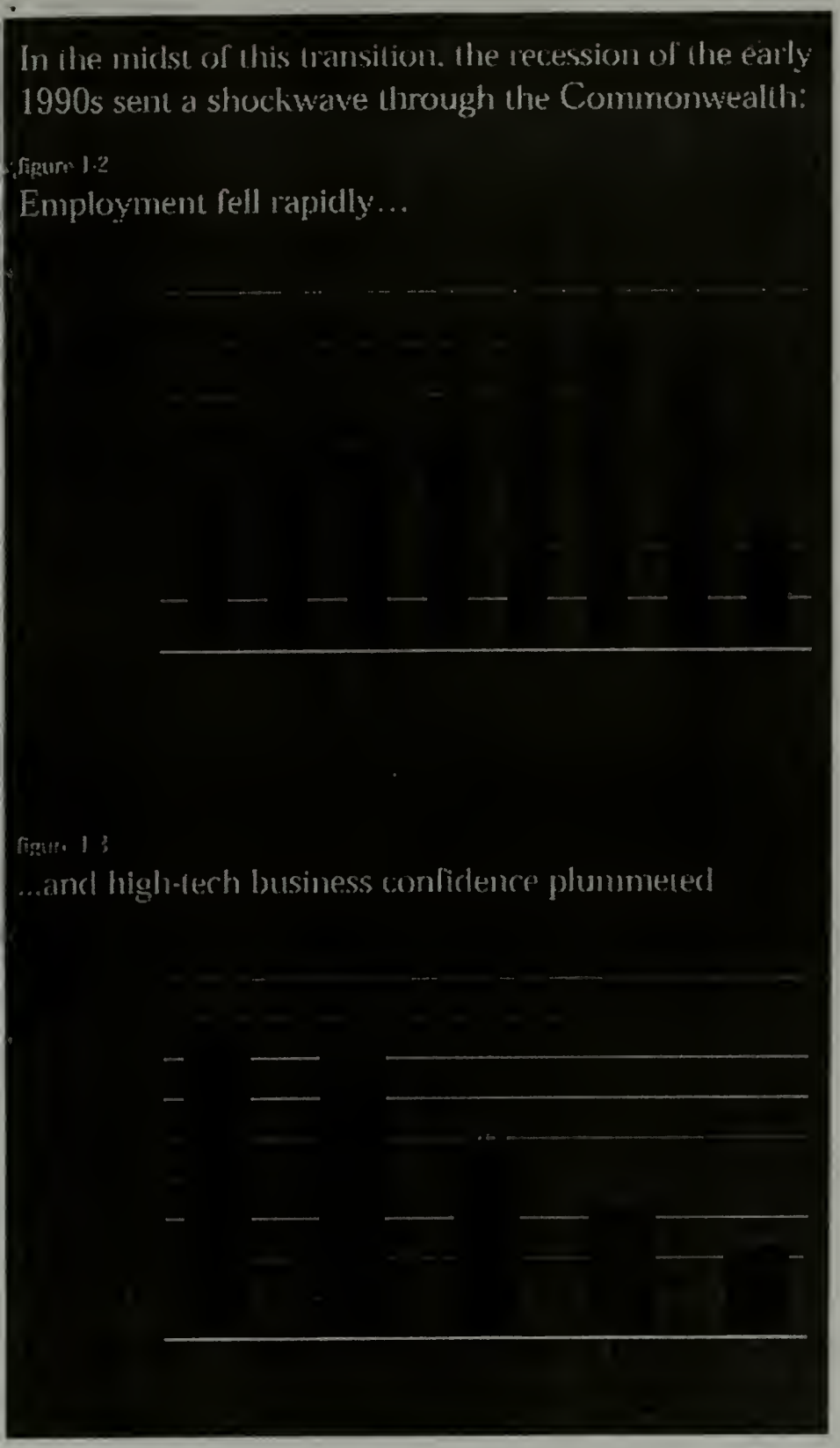


figure 1-3
...and high-tech business confidence plummeted

Choosing to Compete

The government of the Commonwealth, under the leadership of Governor Weld, responded by launching a major strategic review of the Massachusetts economy and its own economic development initiatives. The Massachusetts Executive Office of Economic Affairs and The University of Massachusetts assumed leadership of this initiative. They reached out to business leaders and intellectual resources across the Commonwealth. They involved academics and experts in public agencies and solicited white papers on key policy issues such as workforce development and land-use.[7] They also organized regional meetings to identify opportunities and challenges in the distinct regional economies of the Commonwealth.

Professor Michael Porter, of the Harvard Business School, emerged as an important advisor. His recent work, *The Competitive Advantage of Nations*, offered a powerful framework for addressing the challenges faced by the Commonwealth. Porter saw the continued expansion of the global marketplace as steadily intensifying competitive pressures on existing industries. Porter's key lever of success was constant innovation. And innovation flourished best, he observed, in vibrant, geographically concentrated "industry clusters."(see sidebar *Michael Porters Cluster Theory of Competitiveness*, on right)

Porter and his colleagues at the Monitor Group supported these conclusions with major reports on *The Competitive Advantage of Massachusetts*[8] and *Toward a Shared Economic Vision for Massachusetts*.[9] They identified the Commonwealth's universities as critical economic assets, knowledge-based activities as the new foundation of the State's economy, and knowledge-based industry clusters as the critical engines of competitive success. The battle between the Massachusetts and Silicon Valley-based computer clusters was thus a harbinger of things to come. But unlike Saxenian and other skeptics, Porter saw Massachusetts as well positioned to compete in such high-value knowledge-based activities. The remaining task for the Commonwealth was to develop a strategy that leveraged our critical advantages, shored up our deficits, and created an infrastructure to support adaptive, innovative enterprises.

The Executive Office of Economic Affairs and the University of Massachusetts presented such a strategy in their 1993 report *Choosing to Compete: A Strategy for Job Creation and Economic Development.* The document clearly identified the State's need for a knowledge-based economic strategy, and laid out an agenda for strengthening the Commonwealth's economic position. The Report followed a carefully structured approach for defining the Commonwealth's new role. It defined:

Our economic development objectives

Choosing to Compete highlighted five key economic objectives:

- High and rising real incomes (incomes adjusted for inflation)
- Job growth
- Strong regional economies within the Commonwealth
- Broad economic opportunity
- A high quality of life

Our strengths, weaknesses, and opportunities

Choosing to Compete recognized that defense and minicomputers, the old drivers of the Massachusetts economy, would not bounce back with the return of prosperity. The Commonwealth's distinctive economic strength still lay in our great universities, highly educated workforce, and vigorous entrepreneurial tradition. So the central question, as *Choosing to Compete* put it:

> *"...was whether the high-tech boom has ended in Massachusetts, or merely stumbled badly. If the high tech boom is limited to a group of industries focused on minicomputers and defense, then the answer is probably the*

former. However, it is also possible that the minicomputer- and defense-dominated high tech boom was merely part of a larger and deeper phenomenon – that is, the successful application of advanced research to an ever-broadening array of commercial opportunities and the creation of an environment supportive of rapid, technologically-based innovation."[10]

The answer was clearly the latter, and it was this "array of commercial opportunities" that held out the best prospects for our future.

Our initiatives that promised the greatest incremental value

Choosing to Compete proposed a new economic development agenda for State government centered on "the creation of an environment supportive of rapid, technologically-based innovation." Thus, the State remains responsible for our physical infrastructure. Yet, roads and airports that move people and communications links that move information would now often take precedence over transportation facilities that move manufactured goods. An "environment supportive of rapid, technologically-based innovation" also requires a responsive education and training system. Innovative enterprises need skilled employees; workers need the high-paying jobs these employers offer; and the State has a clear role to play in bridging this gap with its community and State colleges, universities, and other education and training programs. The Commonwealth also had to overcome a legacy of high taxes, ineffective regulation of important economic programs, and a general attitude of suspicion toward business. The realities of the global competitive marketplace required a stable fiscal environment, a high level of government expertise and efficiency, and a far more cooperative relationship with business.

Our specific recommendations, clear objectives, and performance measures

Choosing to Compete then presented a series of proposals to implement this new strategy. These included reforms of the unemployment compensation system, recommendations on coordinating our education, research, and training facilities with the needs of workers and businesses, suggestions for streamlining regulatory and permitting processes, and initiatives for delivering State services and economic development assistance more effectively. *Choosing to Compete* also emphasized regional differences and the need for economic development initiatives to be sensitive to local conditions (see sidebar, *The Seven Economies of the Commonwealth, Each With Distinct Opportunities and Challenges* at end of chapter).

The publication of *Choosing to Compete* and the planning process that preceded it significantly improved the dynamics of the political debate in the Commonwealth. Instead of struggling over the division of the State's dwindling resources – which is all too common in difficult economic times – the effort framed "an inquiry into how those resources might be better invested in our future."[10] Perhaps most importantly, it clearly identified a new role for State government as an active participant in the new knowledge-based economy.

Michael Porter's "Cluster Theory of Competitiveness."

[7] Among the studies that contributed to the strategic review of the early 1990s were "overall economic development plans" (OEDPs) prepared by a number of regional planning agencies for the federal Economic Development Administration; "Workforce Development Policy Blueprints" written for the MassJobs Council by sixteen regional employment boards; regional land use strategies, such as the *Regional Policy Plan* for Cape Cod and *MetroPlan 2000* for Boston; and special studies, such as *The High Skills Path for Southeastern Massachusetts*. For a full listing of the sources and participants, see *Choosing to Compete*, pp.186-192.

[8] Cambridge: Monitor Corporation, 1991.

[9] Cambridge: Monitor Corporation, 1992.

[10] *Choosing to Compete*, p.13.

[13] Institute for Strategy and Competitiveness, Harvard Business School, http://www.isc.hbs.edu/econclusters.htm

A re-focused Massachusetts economy roared back after the bitter years of the 1990s:

figure 1-4
Employment surged...

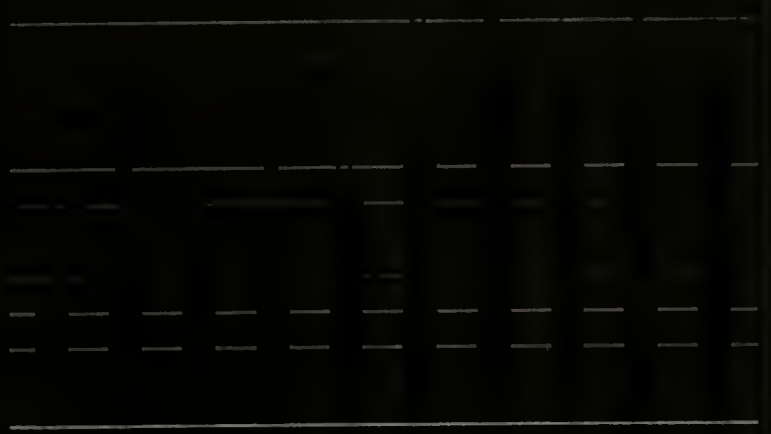


figure 1-5
Unemployment plummeted...

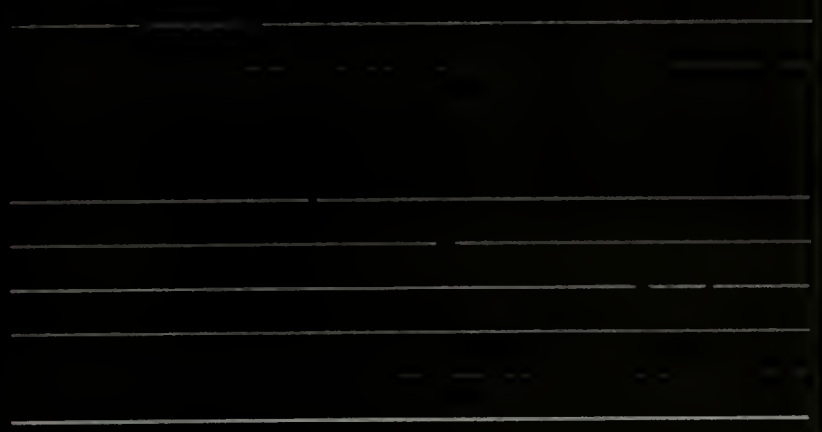
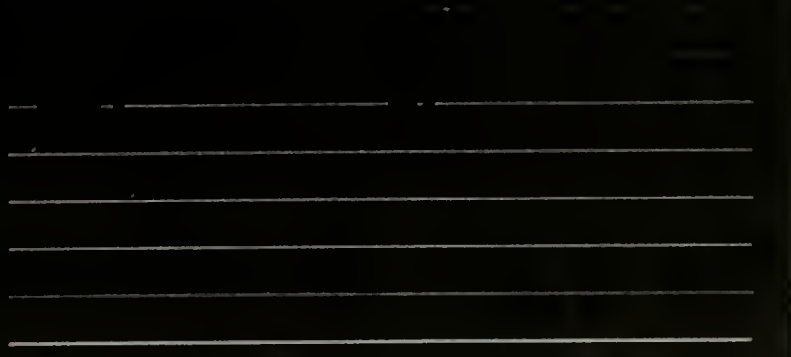


figure 1-6
...and real income per capita rose smartly



A Revitalized Massachusetts Economy

Given the Commonwealth's difficult economic position in the early 1990s, what followed was a remarkable economic resurgence. Unemployment fell to just 2 percent of the workforce by the end of 2000, far lower than the national 3.7 percent rate. Employment had grown at an annual average rate of 2.3 percent since the end of 1993, essentially the same as the nation's 2.4 percent rate. And per-capita real income grew more briskly in Massachusetts than in the nation as a whole. Not all aspects of the economy performed as well, however. Median household income remained at its 1993 level and both population and labor force growth have been extremely sluggish.[11] Taken as a whole, however, the rebound is clearly impressive (see figures 1-4, 1-5 and 1-6).

The primary credit for the 1993-2000 expansion lies within the private sector, as the people of Massachusetts found powerful new ways to create value in the marketplace. In the critical high-tech sector, our gritty entrepreneurs created new firms. Our resourceful engineers, managers, technicians, and production workers developed new skills and even learned new professions. Together, they developed what have essentially become new leading industries in communications and networking, enterprise software and services, biotechnology, and pharmaceuticals. Firms in traditional industries such as tourism, investment management, health care, and consulting also targeted new customers and found new ways to serve old ones.

The State's new initiatives have also contributed to our success. The Commonwealth's education and training programs, research institutions, and regulatory and permitting agencies have become more responsive to the needs of entrepreneurs and workers alike. As a result, there has been a sharp improvement in the business climate of the Commonwealth (see figure 1-7). Our infrastructure, moreover, continues to improve, with the Big Dig, renovations at Logan International Airport, and major capital improvements to schools, roads, and bridges throughout the Commonwealth either completed or scheduled to be complete within the next few years. While State government continued to achieve a higher level of performance and investment, it also significantly reduced taxes and fees and supported the prudent expansion of the State's rainy day fund (see Figure 1-8).

Economic development is a long-term process and requires constant care and attention. The full effects of these new initiatives will be felt over time. What is clear, however, is that State government has become a vital contributor to our knowledge-based economy, helping to build long-term competitive advantage. While much remains to be done, the Commonwealth is far better positioned today to meet the challenges of a dynamic future than it was in 1993.

[11] Massachusetts Division of Employment and Training, http://www.detma.org/lmi/dataprog.htm and Andrew Sum, Mykhaylo Trubb'sky, Neeta Fogg, and Sheila Palma, *The Annual Earnings of Workers in Massachusetts and the United States: An Assessment of Trends in the Level and Distribution of Earnings Over the 1979-2000 Period* (Boston: Center For Labor Market Studies, December 2001).

A Strategic Framework for Economic Development

This Report is the product of a fresh strategic review of the State's economic development initiatives as conducted by the Massachusetts Department of Economic Development with extensive research, analytical, and technical support provided by the University of Massachusetts system and coordinated by the UMass Donahue Institute. Like the effort of the early 1990s, extensive outreach was undertaken to enlist the participation of academic experts, business and labor leaders, community groups, and knowledgeable individuals throughout the Commonwealth. With their help, we identified key economic trends and related leverage points in the new knowledge-based economy and developed a strategic framework that is designed to identify the key economic policy challenges before us. This Report also offers a set of policy options that are intended to serve as resources for business leaders and policymakers as they work together to shape our economic future. A list of contributors and conference participants appears at the end of this Report. Without their input, this document could not have been written.

What follows in Chapter 2 is a review of the Massachusetts economy since 1993, which focuses on the dynamics of economic development. Chapter 3 examines our progress and offers a vision for economic development. Chapter 4 offers a strategic framework for economic development. Part II profiles the seven economic regions of the Commonwealth. Chapters 5-11 highlight the unique characteristics of each region and identify their most pressing economic issues. Part III offers a set of specific policy options designed to provide business leaders and policymakers with tools that can be used to realize a shared vision. Policy options are clearly connected with major economic development goals and performance measures that are designed to help track progress towards achieving these goals. Also included is a description of our statewide planning process as well as a list of those who participated in the effort.

This Report appears at a difficult juncture. Massachusetts, along with the nation, is emerging from a recession that began in March, 2001. Employment growth has all but ceased and unemployment jumped more than two full percentage points, from 2.3 percent at year-end 2000 to 4.4 percent in May, 2002.[12] Job losses have disproportionately affected high-paid positions in our export industries – jobs that bring significant amounts of income into the Commonwealth and support the livelihoods of many other workers and their families. The exuberant optimism of the late 1990s has thus been replaced by a cautious concern about what the future might bring.

Planning for economic development is a long-term process. It is not a response to an immediate crisis. A comprehensive framework for economic development can nevertheless help Massachusetts regain its bearings. It is a reminder that recessions eventually end. Only the nastiest national downturns in the post-war period have lasted two years and most were over in twelve months or less. The Commonwealth is clearly exposed to the slump in IT spending and high-tech investing and to the shock to the national and global economies caused by September 11th. But neither our export sector nor our financial system has been hit as hard as they were in the economic downturn of the early 1990s.

The crucial message of *Toward a New Prosperity* is to focus on the future, while learning from the past. In times of uncertainty, a long-term perspective is critical. We need to identify what the Massachusetts economy should look like in the future and then direct the State's limited resources to getting there quickly and efficiently. Now is the time to effectively address our major problems and significantly enhance the competitive position of Massachusetts and our regions.

Two indicators of our strengthened strategic position:

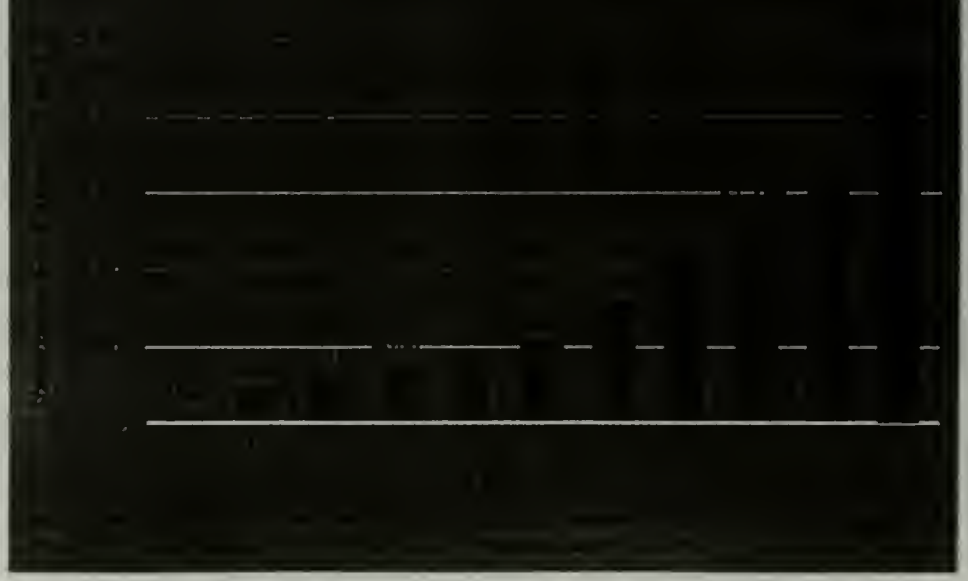
figure 1-7

Smart rebound in business confidence...



figure 1-8

... and the prudent buildup of a rainy day fund



[12] Massachusetts Division of Employment and Training, http://www.detma.org/lmi/dataprog.htm. Andrew Sum, Center for Labor Market Studies, Northeastern University.

The Seven Economies of the Commonwealth

chapter 2

the new dynamics of the

Since the Industrial Revolution of the early nineteenth century, two or three large manufacturing industries determined the economic well-being of the Commonwealth. These were our export industries – first textiles, shoes, and machinery, then defense, electronics, and computers. Because they sold goods beyond our borders, they generated the income needed to import food, fuel, and manufactured goods produced in other states and overseas. When exports boomed, so did the rest of the Commonwealth. The expansion of employment and income in these export industries boosted demand for medical care, housing, restaurant meals, and all other goods and services produced for the local Massachusetts market.

In the new knowledge-based economy, the competitive success of our export sector remains critical to our economic well-being. We must still export to pay for our imports. And the performance of our export sector continues to be the key engine driving the overall economy. What has changed is the composition of that export sector and the nature of the competitive marketplace in which it operates.

The share of Massachusetts employment in manufacturing – our specialty for nearly two hundred years – actually fell below the national average during the downturn of the early 1990s. Manufacturing employment in Massachusetts continues to fall and now stands nearly a percent point below the national norm. Aside from the bulge in the catch-all services sector, the Commonwealth's industrial composition at the dawn of the twenty-first century looks much like that of the nation as a whole (see Figure 2-1).

The New Massachusetts Export Sector

What best distinguishes the Commonwealth's export sector today is its reliance on a highly educated workforce. The high educational attainment of the Massachusetts workforce – and the gap separating the Commonwealth from the rest of the nation – is relatively new, and has developed over the past quarter century. This distinctive educational profile emerged, moreover, in response to the growth of export industries that employ large numbers of college-educated workers (see Figure 2-2).[1]

Before 1970, the overwhelming majority of educated workers were employed in industries that catered to local markets. They were teachers, doctors, nurses, lawyers, accountants, and clergy in what can be termed the "old professional sector." The

[1] Lynn E. Browne and Steven Sass, "The Transition from a Mill-based to a Knowledge-based Economy: New England, 1940-2000," Peter Temin, ed., *Engines of Enterprise: An Economic History of New England*. (Cambridge: Harvard University Press, 2000); Yolanda K. Kodrzycki, "New England's Educational Advantage: Past Successes and Future Prospects," Federal Reserve Bank of Boston *New England Economic Review*, January/February 2000, and "Migration of Recent College Graduates: Evidence from the National Longitudinal Survey of Youth," Federal Reserve Bank of Boston *New England Economic Review*, January/February 2001.

Commonwealth's great universities did attract large numbers of out-of-state students and produced a disproportionate number of graduates with baccalaureate, graduate, and professional degrees. But our economy offered them few attractive job opportunities and most of these people soon left the State to find employment.[2]

Since 1970, however, new professional-intensive industries and activities emerged that did not need to be geographically close to their customers. There were two critical factors:

- **Advances in the economic value of a college education due to...**
  - Improvements in the skills developed and transmitted at colleges and universities. This can be seen in our improved ability to deliver high quality medical care, manage marketing campaigns and investment portfolios, design buildings, and develop pharmaceuticals and IT systems.
  - The development of production technologies that diminished the relative value of craft skill and manual labor vis-à-vis professional design, engineering, and managerial work.
  - The explosive growth of information technologies that augment professional and managerial skills, while reducing the need for administrative and clerical labor.
- **Advances in electronic communications and air transportation** that significantly reduced the cost of moving ideas, people, and products around the globe.

In the 1990s, knowledge-based export activities grew to such an extent that today they clearly dominate the Massachusetts export sector. No two or three large, well-defined knowledge-based industries dominate our exports. Instead, there are *clusters* of firms, competing globally, in the most sophisticated branches of many different industries.[3] Massachusetts, for example, has a disproportionate share of employment in higher education. The most critical factor, however, is that the Commonwealth is home to many of the world's elite universities and teaching hospitals. We are also home to a large securities industry. But what's key is our concentration of firms providing high-value investment management and IT systems development. Massachusetts specializes in management consulting. But what distinguishes our State is the disproportionate number of firms providing services to the world's largest and most demanding corporate clients. The common denominator linking most of our export clusters is their reliance on large numbers of highly educated knowledge workers (see sidebar, *The Massachusetts Export Sector, on next page*).

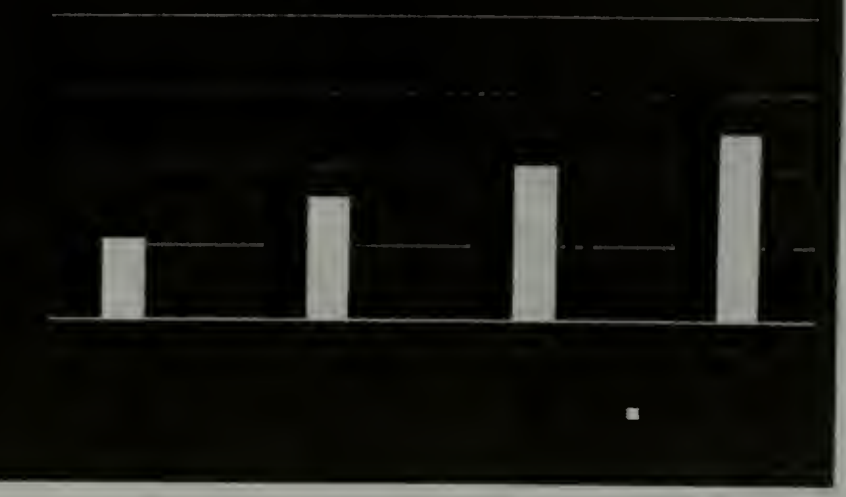
figure 2.1

Aside from more jobs in services, our current industrial structure looks much like the nation...



figure 2.2

...yet there is distinctive educational attainment in Massachusetts



[2] Steven Sass, "The U.S. Professional Sector: 1950-1988," *Federal Reserve Bank of Boston New England Economic Review*, January-February 1990.

[3] For the importance of industry clusters, see the sidebar, *Michael Porter's "Cluster Theory of Competitiveness,"* in Chapter 1.

The Massachusetts Export Sector

figure 2-3
Financial Services Employment, 2000
Cluster Employment = 166,742



figure 2-4
Health Care Employment, 2000
Cluster Employment = 359,899



Figure 2.5
Information Technology Employment, 2000
Cluster Employment = 277,392



Figure 2.6
Knowledge Creation Employment, 2000
Cluster Employment = 328,305



Figure 2.7
Traditional Manufacturing Employment, 2000
Cluster Employment = 135,358



Figure 2.8
Location Quotients for Selected Sectors and Competitor States



The Four Factors Critical to the Economic Development of the Commonwealth

In the 1990s, four factors emerged to define the innovative and competitive potential of the new Massachusetts economy. They are: the supply of knowledge workers; our capacity for networked entrepreneurship; the opportunities presented by globalization; and the challenge of maintaining the quality of life in our communities. These four factors will remain the key to our competitive strength and economic success as we move into the twenty-first century.

Factor 1: Knowledge Workers - While financial resources and physical infrastructure remain important, the quality of human capital in the Commonwealth is the key to our competitive success. The central role of knowledge workers explains several key characteristics of the Massachusetts economy:

Higher per capita income - Workers with similar educational profiles earn much the same wage in the Commonwealth as in the nation. The higher per capita incomes in Massachusetts can be explained by the educational composition of our workforce. This suggests that Massachusetts incomes can only grow, vis-à-vis the nation, if the educational attainment and knowledge-based skills of our workforce are enhanced.[10]

A high rate of worker mobility - The value contributed by highly educated workers is increasingly based on professional skills and relationships that can be taken from one firm to another. Such workers tend to use these skills on projects with a finite life cycle; typically five-to-ten years or less, rather than making a career-long commitment to a particular organization. What's most attractive to knowledge workers are opportunities to participate in innovative projects that promise great rewards, while enhancing their professional skills.

An abundance of small entrepreneurial companies - Small organizations, including semi-independent units of larger companies, offer highly educated workers far more opportunity to exercise their creativity and discretion – and this represents their major contribution to the "new economy."

Factor 2: Networked Entrepreneurship - Entrepreneurs mobilize resources by using various types of networks. These networks include formal professional, trade, and civic associations. Even more important are informal networks, such as business and professional relationships, occasional contacts such as hiring interviews, conversations at business meetings, and introductions at social events. Through these relationships, entrepreneurs access ideas, money, people, and markets.

Networked entrepreneurship is the process that energizes industry clusters. It connects firms with suppliers, customers, academics, government agencies, partners, and even competitors. It can mobilize resources far faster than impersonal market relationships and with far greater flexibility and energy than a traditional corporate enterprise. Especially in a diverse, multi-faceted, and rapidly evolving economic environment, the Commonwealth's capacity for networked entrepreneurship has emerged as a critical competitive factor.[11]

Knowledge-based enterprises thrive on contact with people and ideas outside the organization. They form partnerships with other firms, especially in R&D and marketing. They turn to outside providers for critical services, such as financial, managerial and legal services, employee training, PR, marketing, manufacturing, and logistics. They rely on contributions from key employees with the right skill set and maturity, and who must often be treated as partners, not employees. And they swap information, even with competitors, about everything from promising new technologies to effective ways to compensate their employees.

Such partners, service providers, employees, and information sources must often be geographically proximate. In this context, two types of clustering in knowledge-based economies emerge:

Industry clusters - As Michael Porter and others observed, many of today's most vibrant economies are built around concentrations of firms that compete in the same or related industries. The concentration of computer makers along Route 128 is a fine example. This clustering creates various proximity-based "agglomeration" economies. It aggregates demand for industry-specific resources – for workers with particular skills and suppliers of specialized instruments, materials, and services – and this aggregation of demand serves to attract and expand the

---

[10] Robert Forrant, Philip Moss, and Chris Tilly, *Knowledge Sector Powerhouse* (Boston: Donahue Institute, University of Massachusetts, 2001). A striking trend in the '90s was the convergence of earnings in Massachusetts and those in the nation for workers with the same educational attainment. Aside from Massachusetts workers with high school diplomas, who continue to earn significantly more – fifteen percent more – than their counterparts in the nation, earnings in the Commonwealth are only three to five percent greater than those in the nation. Andrew Sum, Mykhaylo Trubb'sky, Neeta Fogg, and Shiela Palma, *The Annual Earnings of Workers in Massachusetts and the United States: An Assessment of Trends in the Level and Distribution of Earnings Over the 1979-2000 Period* (Boston: Center For Labor Market Studies, December 2001).

[11] For discussions of networks, see Walter W. Powell and Laurel Smith-Doerr, "Networks and Economic Life," in Neil J. Smesler and Richard Swedberg (eds) *The Handbook of Economic Sociology*, (Princeton, NJ: Princeton University Press, 1994) and Stuart A Rosenfeld, *Backing into Clusters: Retrofitting Public Policies*, a report to the Organization for Economic Cooperation and Development, 2001, and *Networks and Clusters: The Yin and Yang of Rural Development*, a report to the Federal Reserve Bank of Kansas City, 2001.

supply of these critical inputs. Competition within these clusters also limits the ability of any large player to exploit their suppliers or customers. More critically, this competition stimulates innovation and the rapid diffusion of new ideas, which makes the entire cluster more competitive.[12]

Urban clusters - Knowledge-based firms tend to locate in metropolitan areas to take advantage of two important resources: first - large and expansive assets, like airports and universities; second - rich supplies of sophisticated business support services, including venture capital and other forms of finance; various types of legal, advertising, and marketing services; logistical services for different types of products; hotel, restaurant, convention, and meeting facilities; printing; and office, R&D, and manufacturing space.[13] Two industries that grew rapidly in the 1990s were "business services" and "personnel supply" – "urban" providers of labor shared among firms in many different industries. Robust transportation networks expand the reach of urban economies. In the 1990s, the rapidly developing Interstate 495 belt created a reciprocal flow of knowledge workers and urban assets and linked the resources of the Boston metropolitan area to many smaller Massachusetts cities and towns.

Factor 3: Globalization - The greatest opportunities for a knowledge-based economy lie within the expanding global marketplace. The United States is exceptionally well endowed with highly educated workers compared to other parts of the world, which is why U.S. merchandise exports are heavily weighted toward sophisticated high-tech products. Current research highlights the significance of globalization to the Massachusetts economy:[14]

Manufacturing - U.S. merchandise exports attributed to Massachusetts equaled 35 percent of manufacturing value added in the Commonwealth – the 11th highest level in the nation.

Services - While State-level service export data does not exist, U.S. service exports have been growing rapidly and in 2001, equaled 39 percent of total U.S. merchandise exports.[15] Most prominent are IT services, such as software and systems integration; financial services, such as currency trading, banking, and investment management; higher education, in the form of payments by foreign students studying in the United States; and R&D, in the form of contracts, royalties, and licensing fees. Massachusetts probably captures a disproportionate share of these major knowledge-based exports. The largest U.S. service export, accounting for more than half the total, is Travel and Tourism. The combination of travel associated with merchandise and service exports, plus the Commonwealth's appeal to overseas tourists, made Massachusetts the eighth most popular U.S. destination for foreigners.

Intra-company trade and investment - Sales by foreign affiliates of U.S. companies in 1995 totaled $1.6 trillion – *twice* as large as aggregate U.S. exports. These sales are especially important in the Information Technology (IT) sector, as hardware can often be manufactured more effectively abroad and overseas customers require local marketing, sales, installation, and support services. This international business pattern generates managerial and technical jobs at parent firms, stabilizes the business, and makes the entire enterprise more competitive. Massachusetts also receives significant foreign direct investment, largely through engineering and marketing affiliates of high-tech companies. This strengthens the Commonwealth as a significant node in the global exchange of technical and commercial ideas and stimulates learning and innovation.

Factor 4: The Increasing Importance of "Place" - Knowledge workers are employed in urban and industry clusters that compete in the global marketplace. But they live in local communities. For highly educated workers, these communities are increasingly not where they were born and raised. Most leave home to go to college and move again to attend professional school or to take an attractive first job. Such workers increasingly live where they chose. As a result, living costs and residential amenities have become critical competitive factors controlling the ability of a knowledge-based economy to grow.

Commentators have long argued that the high cost of living in the Commonwealth, and especially the high cost of the housing in Greater Boston, has dampened our competitive success. But as research demonstrates, environmental quality and lifestyle amenities are becoming more critical than living costs in attracting and retaining young knowledge workers.[16] Outdoor recreational activities and a university ambiance often have more appeal than professional sports teams or "high art" museums and symphonies. While the Commonwealth offers many of these traditional amenities, it gets especially high marks for these newer "quality of life" measures.

---

[12] See Michael Piore and Charles Sabel, *The Second Industrial Divide* (New York, Basic Books, 1984) and Michael Porter, *The Competitive Advantage of Nations* (New York: Free Press, 1990).

[13] Jane Jacobs, *The Economy of Cities* (New York: Random House, 1969), and *The Death and Life of Great American Cities* (New York: Random House, 1961); Edward Glaeser, "Cities, Information, and Economic Growth," *Cityscape: A Journal of Policy Development and Research* 1:1 (1994), "The New Economics of Urban and Regional Growth," in *The Oxford Handbook of Economic Geography*, eds., Gordon L. Clark, Maryann P. Feldman, and Meric S. Gertler, (Oxford: Oxford University Press, 2000).

[14] Jane Little, "Massachusetts: A Neglected 'Global' State," Massachusetts Benchmarks, Summer, 1998.

[15] U.S. Department of Commerce, International Trade Administration. See their web site:.http://www.ita.doc.gov/td/industry/otea/usfth/aggregate/H01t01.html

[16] Richard Florida, *Competing in the Age of Talent*, report prepared for the R.K Mellon Foundation, Heinz Endowments, and Sustainable Pittsburgh, January 2000.

The Dynamics of the New Economy

To get a better understanding of the new dynamics of economic development, we turn to case studies of three Massachusetts industries: biotechnology, Information Technology (IT), and plastics. In analyzing these three industry clusters, we wish to illustrate the influences of the four key competitive factors noted above and highlight their importance to the future of the Massachusetts economy.

The ***Massachusetts biotech industry*** in the 1990s illustrates the emergence of a classic knowledge-based industry cluster. As one of the Commonwealth's major recipients of federal R&D funding, and with extremely close ties to our universities, biotech also illustrates the larger economic contributions of government and academia in knowledge-based economies.

The evolution of the ***Massachusetts IT industry*** in the 1990s illustrates the dynamics of a mature knowledge-based cluster – one no longer as dependent on government and university support as biotech. Even after the decline of the minicomputer, the Massachusetts IT cluster remained vibrant because it was a key capital goods industry of the new knowledge-based economy (the other being the higher education, which creates "human capital.") and it had the flexibility to respond to emerging technical and business opportunities.

The ***Massachusetts plastics industry*** illustrates the dynamics of the Commonwealth's traditional industries in the 1990s. The knowledge-based economy developed new industries, such as IT and biotech, centered largely in Greater Boston. Plastics, centered in the North Central region, was among the Commonwealth's most successful traditional industries during the 1990s. It nevertheless illustrates both the struggles of the State's older industries and regions, and the opportunities smaller businesses have to take advantage of the new opportunities presented by the knowledge-based economy.

The Dynamics of Biotech: The Classic Industry Cluster Model

The rise of the Massachusetts biotech industry illustrates many of the key characteristics of our new knowledge-based clusters. The story begins with the emergence of new technologies in academic laboratories. The new technology, for analyzing and manipulating DNA, has tremendous promise, especially for the enormously high-value pharmaceutical industry. Massachusetts had never been a major player in pharmaceuticals and even today does not rank among the industry leaders in terms of employment. But the new breakthroughs in human genome research place Massachusetts at the innovative frontier of the industry.

The impetus of our biotech cluster – like the defense and minicomputer clusters of the past – has been federal R&D funding. In the 1980s, as the promise of the new technologies came into focus, the National Institutes of Health (NIH) began investing huge sums of money to solve the mysteries of the genome. Massachusetts universities and teaching hospitals were the primary recipients. The Commonwealth received far more NIH funding than any other state in the nation, with annual expenditures estimated at over $1 billion.[17] (see sidebar, *Biotech: A Classic, Knowledge-based Cluster* on right)

This tremendous flow of federal funds created a rich supply of ideas and highly trained workers in our academic institutions. But unlike the case of defense and computers, NIH funding has focused on basic research rather than applied research or development. Unlike the defense industry, the federal government is not "the customer" of biotech products and, as such, does not rely on an entrenched contractor network to manage the transfer of technology from the lab to the marketplace.

Nor have the major pharmaceutical corporations simply hired well-trained Ph.D.s into their research labs elsewhere in the nation. Biotech represents a major discontinuity in the technology of drug discovery. As such, it proved extremely difficult to package and ship the technology to the existing pharmaceutical industry. This was the case despite efforts to encourage such transfers including: a patent system that allowed new biotech discoveries to become negotiable "intellectual property;" the landmark Bayh-Dole Act of 1980 that allowed universities and researchers to claim such negotiable property rights on the fruits of federally funded research; and initiatives by leading Massachusetts universities in establishing units such as MIT's highly regarded Industrial Liaison program to accelerate this transfer of technology. There is a great deal of critical "tacit knowledge" involved in any technology. In Massachusetts, academic centers became prime repositories of this fundamental technical resource. Shared, implied knowledge in these settings inform the perceptions of researchers and decisions advancing technology development.

The actual process of technical innovation – of using biotech to bring valuable new products to market – has been eased by leaner, more nimble entrepreneurial networks. Compared to their governmental and corporate counterparts, these entrepreneurial networks are far richer, more fluid, and diffuse, though often much harder to navigate.

The process begins when university professors, or people with close ties to university labs, establish companies around particular lines of research. Biotech, however, is enormously capital intensive. It requires sophisticated equipment and significant amounts of

[17] Massachusetts Biotech Council *Bionotes*, Fall 2001.

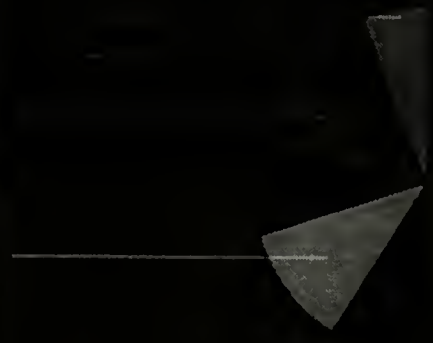
Biotech: A Classic, Knowledge-based Cluster

figure 2 9

Geogrpaphic Distribution of Biotech Firms in MA

figure 2 10

Biotech Firms Compete in a Wide Variety of Markets



time before products come to market. In the case of pharmaceuticals, product development takes a decade or more and can cost hundreds of millions of dollars (see sidebar *The Vibrancy of the Massachusetts "Innovation System"* on pages 25 and 26). These biotech entrepreneurs were able to find funds for their ventures from two main sources – venture capitalists (VCs) and major pharmaceutical companies. Big Pharma, which includes many foreign firms, typically funds specific drug-discovery projects in exchange for marketing rights or similar claims on the results of the project. The VCs typically take an equity stake and they fund a broader set of biotechs, including companies developing tools, information, and services, as well as new pharmaceuticals. Both the VCs and the large pharmaceutical firms typically hold portfolios of high-risk biotech investments[19] and are pleased if any of these investments produce the "the next big thing."

These networked relationships have helped to generate dramatic growth in the Massachusetts biotech cluster. Employment has more than tripled over the decade, from 8,000 workers in 1991 to 28,000[20] in 2001. The number of companies grew just as fast, rising from 88 (1991) to 300 (2000), and they now have a market capitalization of $29 billion. By some accounts, Massachusetts now has the largest concentration of biotech firms in the nation. The cluster is also highly diversified, with firms competing in many different markets. Individual companies are also diversified, competing in more than one biotech market. And this cluster also includes a rich variety of highly-specialized suppliers.

The biotech cluster has benefited from the agglomeration economies provided by the metropolitan Boston economy:

- Because biotech is unusually reliant on networked entrepreneurship, it needs restaurants, conference facilities, and efficient ground transportation. The Massachusetts Turnpike, for example, connects the UMass Medical Center and biotechnology companies in Worcester to the heart of the Boston-Cambridge biotech district, thereby expanding the depth and breadth of the industry cluster.
- Because biotech is a global business with global as well as local networks, it relies on local hotels and taxis, easy access to and from Logan airport, and ample air service to other centers of biotech, finance, and pharmaceutical activity.
- Because many promising opportunities emerge at the boundaries of a particular industry cluster, Massachusetts biotech firms have benefited from links to other powerful clusters in the Commonwealth. Perhaps most important is the recent emergence of bioinformatics. The biotech industry has developed tools that generate mountains of data on microbiological structures and processes. By linking up with powerful IT and computational resources in the Commonwealth, firms can efficiently analyze and manage this data to better understand the underlying biology.

The Dynamics of Information Technology (IT): Continuous Cluster Mobility

The rapid decline of the Massachusetts minicomputer industry at the beginning of the 1990s was a major shock to our economy. The industry had emerged in the 1950s and 1960s and looked much like biotech today – first flush with federal R&D support and university connections, then VC funding and a move into commercial markets. Digital Equipment Corporation (DEC) grew directly out of a major military-funded project at M.I.T. and was the first great success story of the nation's pioneer VC fund – American Research and Development - headed by Harvard Business School professor General George F. Doriot. Soon, other Massachusetts companies entered the field, such as Wang, Data General, Prime, and Apollo. In part spurred on by intense local rivalries, DEC grew to contend with IBM for leadership of the global computer market, and in 1988 employed more than 120,000 workers worldwide.[21]

The minicomputer crash just a few years later was a painful defeat. But it did not mark the end of IT in Massachusetts. The minicomputer companies continued to support old customers and sell new products and services – though at a much reduced rate. More importantly, the crash precipitated a redistribution of the industry's resources into different segments of the broader IT cluster.

The fall of the minicomputer is generally traced to the rise of the personal computer (PC). The 1990s, however, did not become "the decade of the PC." It became the decade of IT networks - from corporate client-server systems to the Internet. Massachusetts had the resources – and the resourcefulness – to succeed on this new innovative frontier.

Distributed computing, a forerunner of modern networking, had actually been an important component of the minicomputer model. Much of our the defense work that took place in Massachusetts, including the air defense project that led to the creation of DEC, involved IT command and control of dispersed weapon systems. AT&T (later Lucent) had a large manufacturing facility in North Andover that became a major provider of communications networking hardware. In essence, the Commonwealth's IT managers and professionals had skills that were applicable far beyond the minicomputer and the firms that produced them.[22]

---

[19] Walter W. Powell and Laurel Smith-Doerr provide a glimpse of this complexity taken from their research in the field. Powell and Smith-Doerr, "Networks and Economic Life," p.395 n.15

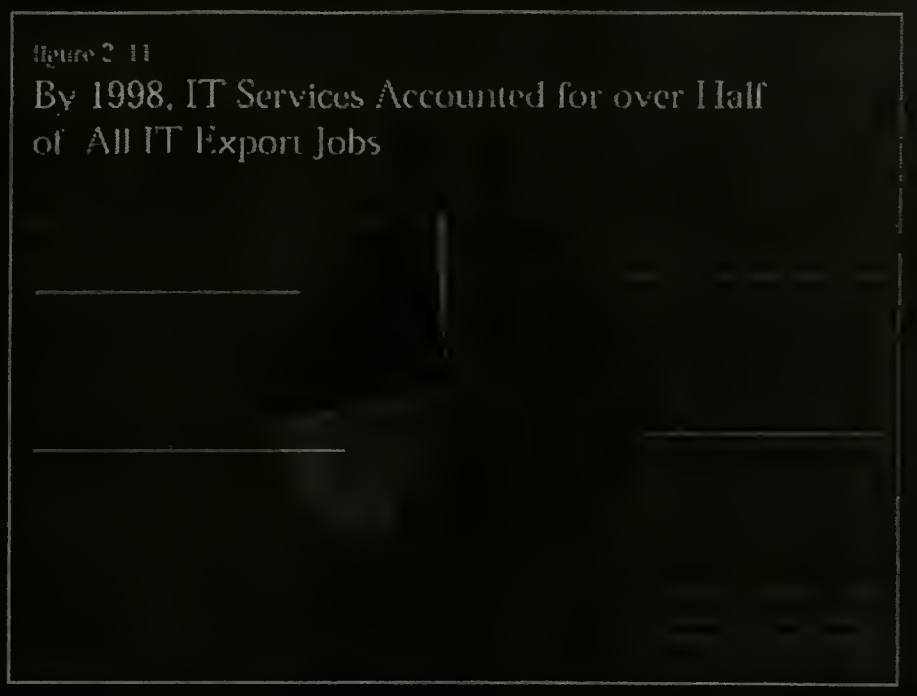
[20] Massachusetts Biotechnology Directory 2001, Massachusetts Biotechnology Council

[21] Browne and Sass, "The Transition to a Knowledge-based Economy."

The Massachusetts IT Export Sector Shifts Sharply Toward Software and Systems Integration

figure 2-11

By 1998, IT Services Accounted for over Half of All IT Export Jobs



Over the course of the decade, the high-value activities within the IT industry shifted from computers to semiconductors and communications, from hardware to software, Internet service provision, and content development, and to "enterprise" information systems. Massachusetts IT managers and professionals, many from the minicomputer industry, soon developed exciting new technologies and commercial applications in these areas. Their innovations often involved significant discontinuities in markets, distribution channels, business models, and technical traditions. This required the creation of new firms - even new occupations. The Commonwealth, however, was an unusually fertile ground for developing such ventures because it had:

- The necessary "urban cluster" resources – supporting lawyers, VCs, and marketers, and top-tier education and training, transportation and communications, and hotel, conference, and convention facilities.
- The classic "industry cluster" resources – large numbers of highly skilled people, specialized suppliers, sophisticated customers, and networking organizations such as the Massachusetts High-Tech, Telecommunications, and Software and Internet Councils.
- A unique "cluster" resource – a large concentration of people called "influencers," – the industry analysts, journalists, consultants, and academics who sort through business and technology trends and provide leadership for the global IT sector. Being close to "the conversation" about emerging directions has been a critical advantage in this rapidly changing, multi-faceted sector.[23]

The Massachusetts IT export sector branched out in many different directions and by the end of the decade employed 100,000 people. It stretched across computers and communications, materials, components, and software development, systems integration, content delivery, and the provision of ongoing service and support. As seen in the flow of VC funds and IT employment, software and systems integration – two service industries – emerged as most important. Together they absorbed over half of VC investment and employment in the Commonwealth's IT export sector[24] (see sidebar above, *The Massachusetts IT Export Sector Shifts Sharply Toward Software and Systems Integration Services*).

The Commonwealth's software and systems integration industries follow the knowledge-based economy model. They rely on highly educated workers organized in small firms that depend on networked entrepreneurship. Sixty percent of all Massachusetts software firms employ four or fewer workers; nearly 40 percent are three years old or less. Only five Massachusetts systems integration firms have more than 500 workers and one quarter are three years old or less.[25]

What makes the software and systems integration industries so fluid and dynamic is the fact that capital requirements are low and not highly specialized. These industries use standard office space, which can be rented; PCs, which are inexpensive; and "smart people." Biotech, by contrast, needs costly, industry-specific assets and skills and very patient investors. So in IT, there are many more firms and much more self-employment.

The firms that populate the Massachusetts IT service sector are "machine-shops" for the new global knowledge-based economy.

---

[22] Craig Moore, "Information Technology: The New Foundation," *Massachusetts Benchmarks*, Fall '98.

[23] This observation and the term "influencer" comes from Joyce Plotkin, President of the Massachusetts Software and Internet Council.

[24] Craig Moore, "Information Technology: The New Foundation," 1998.

[25] Ibid.

The Vibrancy of the Massachusetts "Innovation System"

While funding for research and development remains steady, industry increases its share of investment

figure 2-12
Total R&D % GDP by Source of Funds

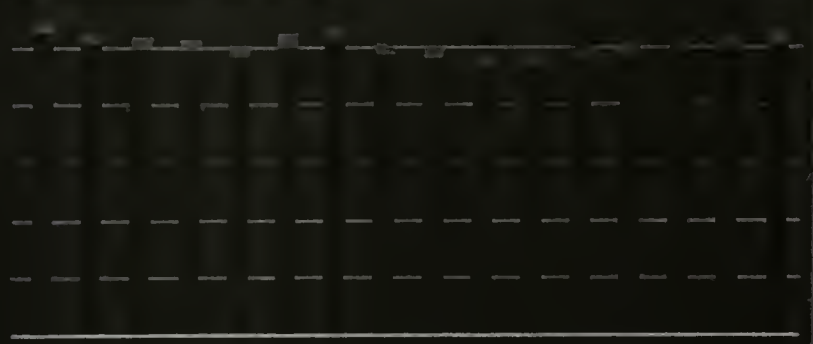


figure 2-13
Federal R&D % GDP by Character of Work



figure 2-14
Industrial R&D % GDP by Character of Work



Venture capital investments fuel growth and innovation

figure 2-15
The boom and bust in venture capital spending in select markets

figure 2-16
Distribution of venture capital investments in Massachusetts, 2001



Increased private investment encourages entrepreneurs

figure 2-17
Massachusetts is the national leader in patents per capita



figure 2-18
The number of "Gazelle" firms increased during the 1990s



IT is now the fundamental tool of educated workers in business and the professions worldwide. It requires an enormous amount of intense, creative effort to fit these tools for the job. Massachusetts firms thus develop software components and tool kits in areas ranging from graphics, networking, and data management to "vertical" solutions for particular industries or professions.

Nearly every business and professional group now relies on a community of software and systems integration specialists to support their particular IT needs. These service providers often become intimately connected with these businesses and professions and their activities often cross over to adjacent IT activities. They move from software into systems integration or consulting; or augment a web-service venture by developing content or adding a critical software application. They also move into their client's industries as well. The emergence of bioinformatics on the boundary between IT and biotech is typical. Interestingly, the Massachusetts Biotech and Software and Internet Councils both identify bioinformatics as a major opportunity for their respective industries. In knowledge-based economies, the most powerful "knowledge spillovers" often flow across industry lines in this way (see sidebar, *The Massachusetts IT Export Sector Shifts*, on page 24).

The lesson from the IT cluster, and the rise of the Internet in particular, is that innovation is an incredibly dynamic process. The underlying technologies and business models are continually evolving, dividing, and merging. Knowledge-based economies must be analyzed over time rather than at a particular moment. Thus, the Massachusetts minicomputer industry of the 1980s is best seen as a powerful convergence of technical and economic resources in a larger economic stream. It held together for about two decades, then came undone in the early 1990s. Those resources flowed into succeeding computer architectures, and out into communications, systems integration, software, Internet development, and other new dynamic industries within the IT sector as well as along its fuzzy borders. The recent sharp drops in demand in the Internet and telecom businesses foreshadow another economic cycle of adaptation and diffusion.

The Dynamics of Plastics: Leveraging Traditional Industries

Plastics was among the Commonwealth's most successful "traditional" manufacturing industries in the 1990s. While essentially all Massachusetts manufacturing industries lost jobs during the decade and overall manufacturing employment fell more than fifteen percent, business in plastics was brisk and employment rose by more than ten percent.[26]

Plastics is "traditional" in that the industry relies on more typical "shop floor" manufacturing and is dominated by small, locally owned firms, primarily in the central and western parts of the State. They typically employ up to 45 employees, mostly on the shop floor. Approximately 700 such companies in the Commonwealth make a wide range of products, which can be grouped into three main categories: 1) packaging, such as plastic bags and packing materials; 2) high-volume commodity items, such as pails, cosmetic tubes, and disposable cutlery; and 3) specialty products, such as parts for aircraft, automobiles, medical devices, computers, and telephones. Also considered "traditional" are the economic advantages and challenges facing Massachusetts plastics manufacturers:[27]

• **The industry's main competitive advantage** is the quality of employee metalworking skills in the Commonwealth. Plastics manufacturers generally use injection-molding machines that need precision molds for efficient production and to make a premium product. Thus, the pieces from different Lego® sets snap together cleanly because they were all made from high-quality precision molds. Mold making is a branch of tool and die making, a well-known Massachusetts manufacturing skill set. While precision molds are important in all branches of the industry, they are critical in the production of specialty parts for other manufacturers.

• **The industry's main competitive disadvantages** are a lack of adequate space and the high cost of energy and transportation. The industry needs modern one-story buildings with good rail, road, water, sewer, gas, and electric connections. Such space is in short supply and vacancy rates in Leominster, the center of the Massachusetts plastics industry, fell below five percent at various points during the 1990s. Energy and transportation costs in the Commonwealth are relatively high and represent a significant percentage of total production costs. As a result, Massachusetts manufacturers primarily sell to customers in the New England and Mid-Atlantic states. While there was a flurry of interest in overseas markets in the early 1990s, exports remain less than ten percent of total industry sales.

What differentiated plastics from other traditional Massachusetts manufacturing industries was a sharp increase in product demand, not a dramatic shift in productivity. The industry did not suddenly become more competitive than other traditional Massachusetts manufacturers. Instead, it benefited from a major increase in the use of plastics, for items such as bottles and auto parts, and from a surge in sales of items such as computer wiring and cabling and shells for phones, laptops, and other types of office equipment.

As in most other traditional Massachusetts industries, the knowledge-based economy had a very different impact on plastics than it did on the biotech or IT industries. A survey of manufacturers in the North Central region found little contact with the Commonwealth's top-tier academic plastics programs at UMass Amherst and UMass Lowell. Nor did these manufacturers see much value in developing a local plastics technology center.

Manufacturers did, however, identify worker training as their primary need. Skilled mold-makers have been in short supply since the demise of apprenticeship programs in the 1960s and 1970s. Today's mold-makers need training in CAD-CAM programs, an important upgrading challenge for firms and workers, as well as in traditional mechanical skills. Workers who operate modern computerized injection molding machines also need training to set up, monitor, and maintain the equipment. As Asian and Hispanic immigrants now make up one quarter of the workforce, the industry also needs remedial English as a second language (ESL) programs.[28]

Raising the level of workforce skills has been difficult. The problem is a lack of utilization, not of programs. Institutions such as the Center for Technical Education at Leominster High School and Mount Wachusett Community College offer highly regarded instruction. But many companies in the industry are small. They don't have the management resources necessary to stay abreast of current offerings or to get their workers involved. There is also a "market failure" dilemma: Workers who get trained capture the bulk of the benefits in the form of higher market wages. So employers have little financial incentive to pay for the training. Workers, on the other hand, often lack the time and funds to pay for the programs. Many are also unwilling to bear the risk that the investment of time and money will not lead to a better job and higher pay.

Although the knowledge-based model has not penetrated very deeply among the Commonwealth's plastics manufacturers, three ventures illustrate its potential to transform traditional Massachusetts industries:

• Ongoing efforts by local business and government to strengthen the industry cluster and to develop networking opportunities. This includes efforts to improve rail service and lower electricity rates and the organization of massPlastics, a major tradeshow held every 18 months in Fitchburg. The City of Leominster and the local Chamber of Commerce have also collaborated on various initiatives to rationalize worker-training programs and provide access to UMass faculty at Amherst and Lowell.

• Plastics.com, based in Fitchburg, is a Web portal created by Greg Koski, a UMass-Lowell-trained plastics engineer with extensive experience in management and communications. The site is a networking initiative that targets "plastics professionals" ("professionals being a more elegant name for "knowledge workers"). It promises "the ultimate peer-to-peer experience, providing actionable information, tools, and services to help members get their jobs done." The site offers technical and business information, online training and "forums" for discussing specific technical or business issues, a service connecting manufacturers and customers, and a marketplace for buying and selling new and used equipment.

• Nypro, based in Clinton, has emerged as an enormously successful knowledge-based plastics manufacturer with $500 million in sales and plants in a dozen countries around the globe. The company has extended its value proposition far beyond molding to offer "complete product outsourcing" – integrating backward into product design and forward into product assembly. It uses sophisticated IT systems for supply-chain management and to keep its customers and far-flung operations continually in the loop. Clinton houses the company's headquarters, its product design and development center, one of two precision mold-making centers, a substantial molding facility, and its innovative educational initiatives –the Nypro Institute and Nypro Online. The Institute is Nypro's corporate training center and works with colleges around the world to offer English language and high-school equivalency instruction, as well as undergraduate and graduate programs in business and engineering subjects. Nypro Online, run in conjunction with UMass-Lowell offers college-level courses in plastics engineering and a certificate in plastics technology to the entire industry. For such efforts, Nypro won the 2001 University of Massachusetts Employee Education Circle of Distinction Award.[29]

Challenges Moving Forward

These three case studies illustrate the new dynamics of economic development at the industry cluster level. They highlight the importance of the four underlying factors identified above and their contribution to the Commonwealth's generally successful response to the sharp downturn of the early 1990s. They also underscore our primary economic challenges going forward:

1. **Knowledge workers** –clearly the most important resource in the "new" Massachusetts economy.
2. **Networked entrepreneurship** – the primary means for mobilizing resources in industry or urban clusters.
3. **Globalization** – which has profoundly reconfigured market opportunities and the competitive environment.
4. **Quality of "place"** –the quality of life in our communities is not just an ultimate economic objective, but is now a critical factor in the global competition for knowledge workers and knowledge-based industries.

---

[26] The percent change figure for employment in plastics is taken from CES 790 data for SIC 308 - "Miscellaneous Plastics Products." http://www.detma.org/lmi/dataprog.htm.

[27] This section relies on an interview with Todd Shimkus, Vice President of the North Central Chamber of Commerce, and Steven Landau, Steven Ellis, William Ennen, and Robert Forrant's, "Strategies to Support the Plastics Industry in North Central Massachusetts: A Report to the City of Leominster," UMass Donahue Institute, University of Massachusetts, March 2000.

[28] Interview with Todd Shimkus

[29] See the Nypro website, www.nypro.com.

Challenges Moving Forward: Knowledge Workers

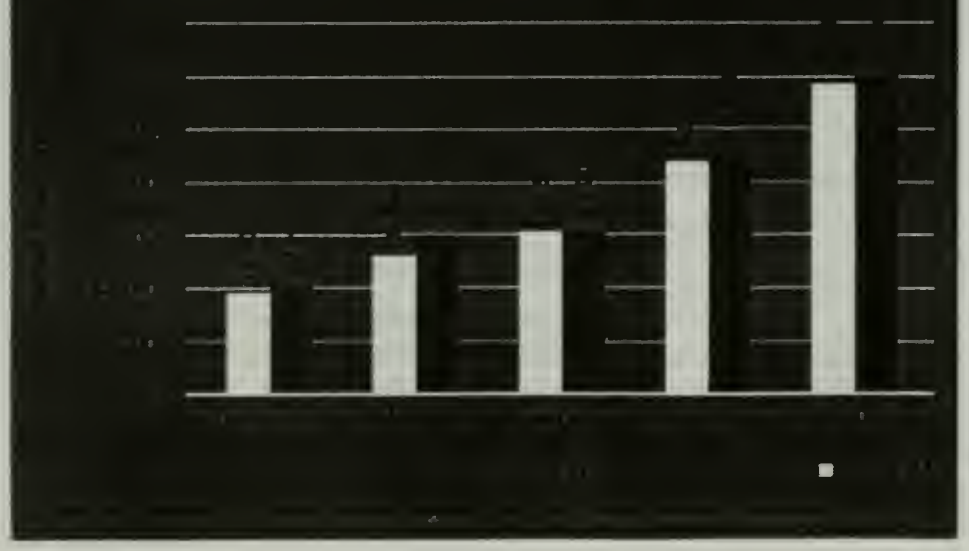
Knowledge has become the fundamental instrument of value creation in the New Economy. As such, the Commonwealth devotes an enormous amount of resources to its educational and training programs. The majority of our young people now go to college and a good portion will spend nearly twenty years in school. Periodic training to upgrade one's skills is now routine for lawyers and physicians as well as shop floor workers. And the returns to these investments have been excellent.

The primary risk going forward is the limited reach of these programs. The 1990s were marked by significant shortages of science, engineering, health care, and education professionals. While the incomes of college-educated workers soared, those without a four-year degree earn little more today than they did in the difficult years at the beginning of the decade.[30]

Expanding access to higher education is one clear response, and the proportion of Massachusetts workers with a college degree rose smartly in the 1990s. Employers in both biotech and plastics would gladly hire production workers without a four-year degree if they had the proper skills. Both groups of employers highlight a serious shortage of workers trained to operate today's sophisticated production equipment. Most workers with a high-school diploma or less find employment not in production, but in service occupations – in hotels and restaurants, medical and nursing facilities, building maintenance and security, and the like.[31] In these occupations as well, training can augment worker skills and lead to greater productivity and income[32] (see figure 2-19).

Our challenge is to develop an education and training system that upgrades the skills and efficiency of our workforce in response to labor market demands. What complicates the task is a serious deficiency in the basic skills needed to compete. One-third of the Massachusetts workforce – 1.1 million Massachusetts workers – lack a high school diploma or GED, speak or write limited English, or have significant deficits in basic verbal or quantitative skills.[33] As the Massachusetts workforce historically grows quite slowly, upgrading the skills and efficiency of current workers is nevertheless the most effective way to provide an adequate supply of knowledgeable workers to a growing economy.

figure 2-19
Education and Knowledge-Based Skills Are Essential in Today's Economy



Challenges Moving Forward: Networked Entrepreneurship

The Commonwealth's urban and industry clusters are incredibly rich in resources, firms, and workers who use a web of local connections to access critical inputs and opportunities. This is "networked entrepreneurship," the focus of AnnaLee Saxenian's book comparing Silicon Valley to Route 128. What Saxenian did not foresee, however, was the flexibility and strength of networked entrepreneurship in Massachusetts. It underlies the successful reorganization of our IT cluster after the fall of the large, vertically integrated minicomputer makers. It also allowed our biotech industry to respond to the precipitous drop in VC funding and turn toward corporate sponsorship – to shift its attention away from building tools and "promise" to focus on concrete drug development.

The primary challenge moving forward is the limited reach of our entrepreneurial networks. Many small firms and workers simply do not have the capacity needed to participate in these networks. As Boston is the center of the State's most vibrant entrepreneurial networks, distance significantly diminishes their usefulness for many firms and workers in the Commonwealth. Even within Boston, race and a lack of proficiency in English can restrict participation. A major consequence of this limited capacity is insufficient access to training and technical assistance, as seen in the plastics industry in the North Central region. Distance from Boston and weak entrepreneurial networks in many industries and regions limits access to capital, especially venture capital, and to technical and informational resources that are abundantly available in the Commonwealth.

Expanding the reach of our entrepreneurial networks is the task of Massachusetts' trade associations, such as the Biotech and Software and Internet Councils; local governments and Chambers of Commerce, such as the plastics initiatives underway in Leominster; and entrepreneurial ventures such as plastics.com. In labor markets, intermediaries such as professional associations, unions, and

[30] Andrew Sum, et al., *The Annual Earnings of Workers in Massachusetts and the United States.*

[31] These occupations are most prevalent among workers with a high-school education or less in the Boston metropolitan area, reports Richard LaRock, research assistant at the Center for Urban and Regional Policy at Northeastern University.

[32] Joan Fitzgerald and Virginia Carlson, "Ladders to a Better Life," *The American Prospect*, June 19-July 3, 2000.

[33] John Comings, Andrew Sum, Johan Uvin, et al., *New Skills for a New Economy: Adult Education's Key Role in Sustaining Economic Growth and Expanding Opportunity* (Boston: MassINC, December, 2000).

social service agencies have also been able to support networks that expand worker productivity and provide access to better jobs.[34]

Maintaining our competitive strength in advanced academic research is an especially critical challenge. Many competing states have adopted a research-led economic development strategy and are investing heavily in university R&D facilities. One indication of their competitive success is Massachusetts' declining share of federal R&D funds. If Massachusetts were to lose this competitive edge, our entrepreneurial networks would lose a key competitive advantage in today's knowledge-based economy.

Challenges Moving Forward: Globalization

Globalization presents enormous opportunities. The knowledge-based goods and services we produce are especially attractive to overseas markets, and overseas sales generate a major portion of the Commonwealth's export earnings.

Globalization also brings new challenges. Massachusetts firms now compete with many powerful, fast-moving high-tech overseas rivals. While most of our traditional manufacturers sell to domestic markets, foreign producers also increasingly offer vigorous competition.

Our most critical challenges, however, increasingly arise from limited access to global markets. Access to these markets is increasingly dependent on access to the Internet. The Web is the new "face" of the marketplace, and it knows no national boundaries. Yet Massachusetts communities and regions lack affordable broadband service. Left unaddressed, this limited access will severely impede their participation in the new world of business.

Another challenge arising from limited globalization is the lack of institutions that can maintain macroeconomic stability. Recent swings in global demand have been large and have exacerbated economic swings in the Commonwealth. Thus, Massachusetts merchandise exports surged by one third in the boom year of 2000, then fell back to their former level in a weak 2001.[35]

Our final challenge is the enhanced need for security. The September 11 attacks damaged the global marketplace, added significant costs to trade and travel, and cut worldwide demand for goods and services provided by our knowledge-based industries. More broadly, as described in *The Lexus and the Olive Tree*, unprecedented mobility and access give individuals the power to shape market outcomes and effect nations.[36] Going forward, we need the means to protect our citizenry and economy from untoward exercise of that power.

Challenges Moving Forward: The Quality of "Place"

Firms and workers have long been attracted by the quality of life in our communities. In this new age of the mobile knowledge worker, it has become a major competitive advantage.

The main challenge moving forward is to ensure that economic development strengthens rather than diminishes our quality of life. Development typically puts pressure on real estate prices, the environment, and existing infrastructure. Thus, in the boom years since 1997, the median price of a single-family home in the Boston metro area doubled to hit $367,000 in 2001.[37] Many citizens of the Commonwealth can no longer translate income gains into home ownership. Real estate development, moreover, has increasingly taken the form of sprawl, which generates pollution, congestion, and a general degradation in the quality of life.

The primary risk moving forward is to accommodate economic development while maintaining and enhancing our quality of place. Rapid economic growth along Interstate 495 highlights the challenge before us. The corridor offers attractive countryside, New England charm, more reasonably priced housing, access to both Boston and vibrant recreational areas, and rapid growth in high-paying jobs. The highway itself, however, runs along the boundaries separating many different watersheds and political jurisdictions. Building new sewers and schools and relieving congestion on the area's roads have emerged as critical economic development issues along the corridor.[38]

The challenge before us is to develop a vibrant knowledge-based economy while preserving critical environmental and quality-of-life assets. We need an infrastructure that responds to the need for knowledgeable workers; that enables networked entrepreneurship throughout the Commonwealth; that gives broad access to the opportunities offered by globalization while effectively responding to its threats; and that strengthens the quality of "place." These are the leverage points of a new strategic framework for economic development. Their identification also highlights the importance of developing new economic objectives for this new economic time.

---

[34] See Fitzgerald and Carlson, "Ladders to a Better Life," to see how labor-market intermediaries have organized career ladders for low-paid urban service workers that involve training and certification and the expectation that workers will "hopscotch" up from one employer as they make their way forward. This approach, which parallels the model set in sophisticated knowledge-based industries, demonstrates the importance of education and training throughout the economy. It also underlines the importance of entrepreneurial networks to make such an economy operate effectively.

[35] Merchandise exports are used to track overseas sales because data is available on this component of Massachusetts exports. See the Federal Reserve Bank of Boston's New England Economic Indicators Database, http://www.bos.frb.org/economic/neei/neeidata/totexp.csv

[36] Thomas Friedman (New York: Farrar, Straus, and Giroux, 1999).

[37] http://www.bos.frb.org/economic/neei/neeidata

[38] Sarah Kuhn, "Interstate 495 West," *Massachusetts Benchmarks* Fall 2000.

chapter 3

toward a shared vision for

Choosing to Compete proposed a vision for Massachusetts that went beyond the traditional economic development objectives of job growth and economic prosperity to include regional equity and broad economic opportunity. This vision also highlighted the importance of a good quality of life (see box, *The five elements of the "Choosing to Compete" vision*). A central theme in *Choosing to Compete* was that Massachusetts could achieve these objectives by enhancing the competitiveness of the Massachusetts economy in the national and global marketplace.

The five elements of the "Choosing to Compete" vision

- A rising standard of living
- Job growth
- Regional equity
- Broad economic opportunity
- A high quality of life

This chapter re-examines the vision articulated in *Choosing to Compete*. It will assess the Commonwealth's progress using the benchmarks proposed in that document. While this benchmarking is instructive, Chapter 2 highlights several dynamics that enhanced our competitiveness and eased the State's adaptation to the dramatic structural changes in the economy that took place during the 1990s. These factors also require us to re-examine that vision as we develop a new strategic framework for the New Economy.

Given the increasing importance of place and workforce mobility, as highlighted in Chapter 2, improving the quality of life in the Commonwealth has emerged as an overarching goal. Broadly defined, "quality of life" includes jobs, prosperity, and regional opportunity, as well as environmental sustainability, a healthy and safe citizenry, and a strong civic culture. This chapter will develop the foundations of a new vision aimed at enhancing quality of life in all corners of the State.

With such a vision in place, we can then turn to the development a strategic framework for economic development in the Commonwealth. This framework will focus thought and action on policy options that support this vision and our prosperity over the long term. This vision and related strategic framework must be shaped by a review of our previous policy initiatives and their impact on economic growth and competitiveness.

Building Competitive Advantage: A Look at Economic Progress and Challenges Over the Past Decade.

As highlighted in Chapter 2, Massachusetts' recovery from the deep recession of the early 1990s and its adaptation to dramatic structural changes in the economic environment is impressive. In many important ways Massachusetts has been a leader in a shift to a knowledge-driven, technology-led, and increasingly global economy. This transition has had significant impacts on firms,

workers, families and communities, which can be evaluated against the vision put forth in *Choosing to Compete*. The following analysis highlights the State's progress and underscores remaining challenges.

A high standard of living

The Commonwealth has made significant progress in improving the standard of living for many of its citizens. During the 1990s, real per capita personal income – that is, income adjusted for inflation – exceeded overall U.S. levels. The growth in income remains especially strong in our knowledge-based export industries.

While significant progress was made, a number of important challenges remain. Most notably, as Figure 3-2 shows, median real household income in the Commonwealth remains flat. This indicates that the middle-income wage earners have not shared in the gains of the past decade. A major factor limiting the growth of average and median real income measures was a sharp rise in housing prices. Home-owners have benefited from this appreciation, and standard income measures fail to capture that gain. Rising home prices, however, have seriously eroded the prosperity of non-homeowners, making it difficult for many Massachusetts workers to afford a first home.

Job growth

Choosing to Compete targeted employment growth and low levels of unemployment as key objectives. Employment data indicate that Massachusetts has been successful in meeting these goals. Despite severe adverse shocks to our export sector in the early 1990s, as seen in job losses, unemployment declined steadily over the decade, going from well above to well below the national average (see sidebar *Goal: Job Growth,* pg.34). Employment growth was also brisk, rising at essentially the national rate.[1]

Looking forward, the declining population in the 18-24 age cohort presents a different challenge. This age group represents a critical mass of future workers and a base of potential entrepreneurs. How well the State responds to this coming demographic decline will have a major impact on our economy for years to come.

Strong regional economies within the State

Choosing to Compete emphasized the need for the State to build strong local economies by capitalizing on unique regional strengths. That all regions shared in the declining rates of unemployment suggests important progress. However, there have been clear disparities in wage and employment growth across regions (see sidebar *Goal: Strong Regional Economics,* pg. 37 and 38). Greater Boston posted impressive gains, but the Pioneer Valley,

[1] Since 1970, employment growth in the Commonwealth has lagged the national rate by _ of a percentage point in part because our employment growth has been slower, unemployment has averaged _ of a percentage point below the national rate. Despite the severe hit to our major export industries at the beginning of our decade, our economy has significantly outperformed these long-term benchmarks.

Goal: High Standard of Living

3?

Figure 3-1

Real income per capita rose smartly

Goal: High Standard of Living (continued)

figure 3.2
Real median household income



figure 3.3
Housing Affordability Trends
in the Metropolitan Boston Area

the Berkshires, and the Southeast regions had a far more difficult decade. The sharp decline in the number of young adults, and projected slow-growing workforces in all regional economies, also portends further challenges to promoting economic growth and entrepreneurship across the Commonwealth.

Broad economic opportunity

Choosing to Compete proposed a vision that promoted broad economic opportunity for all. While all population groups have seen the benefits of increased employment, African-Americans, in particular, did not fully participate in the Commonwealth's robust growth during the 1990s. Unemployment in many cities also remains chronically high, running 50 percent above the statewide average in cities like Fitchburg, Lawrence, Springfield, Fall River, and New Bedford. Many communities throughout the Commonwealth continue to have limited access to affordable high speed internet service. Thus, while overall economic progress has been significant, extending economic opportunity to all Massachusetts regions and communities remains a significant challenge (see sidebar, *Goal: Broad Economic Opportunity*, pg.38).

A high quality of life

Choosing to Compete insisted that economic development need not come at the price of environmental degradation. While many see economic and environmental goals at odds, the document promoted a vision in which the two objectives were compatible. The results achieved over the course of the past decade are a testament that such progress is possible (see sidebar, *Goal: A High Quality of Life*, pg.41). A more collaborative approach to business and environmental regulation, in particular, resulted in enhanced

pollution control. Success has been accompanied by new challenges, such as sprawl. If not addressed, these new challenges threaten the essential quality of life that is New England and uniquely Massachusetts.

A review of the previous decade from the perspective of the vision developed in *Choosing to Compete* is instructive. Much has been accomplished in achieving that vision, but significant challenges remain. Before moving forward, however, we must understand the role of government in supporting economic competitiveness. In particular, we need to see how government can contribute by participating in the entrepreneurial networks highlighted in Chapter 2.

Developing a Policy Framework: Understanding the Role of Government

Choosing to Compete emphasized the importance of a shared leadership role for State government. The Commonwealth, it declared, had to be "an effective economic development partner with local and regional interests throughout the State, providing the incentives and assistance to promote competitiveness".[3]

The economy has since changed in ways that have significantly increased the importance of this partnership with business and with non-governmental organizations and other levels of government. The relationship between business and government in the past has often been adversarial. In today's increasingly networked, knowledge dependent economy, we need far more flexibility and cooperation.

Building a Vision for the New Century: Understanding the New Economic Landscape

To develop a shared vision for the Commonwealth's future, we must identify the forces that will influence the State's future economic prosperity. As highlighted in Chapter 2, four dynamic factors are likely to shape the competitive landscape going forward:

The knowledge worker - The increasing technological demands on workers points to the on-going importance of developing workforce skills. This is not only true for workers shifting to the expanded service sector, but for those employed in manufacturing as well. The need for upgrading skills is an ever-increasing challenge for both business and government. It is a challenge that extends across the lifecycle – from early childhood and K-12 to higher education – and to the need for lifelong education and training. An effective partnership between business and government is required to meet these education and training needs and to insure that Massachusetts remains on the frontier of innovation.



[2] Massachusetts Technology Collaborative, *Index of the Massachusetts Innovation Economy*. 2001. p.56

[3] *Choosing to Compete*, p.30.

Goal: Job Growth (continued)

figure 3-5
Labor force and job growth

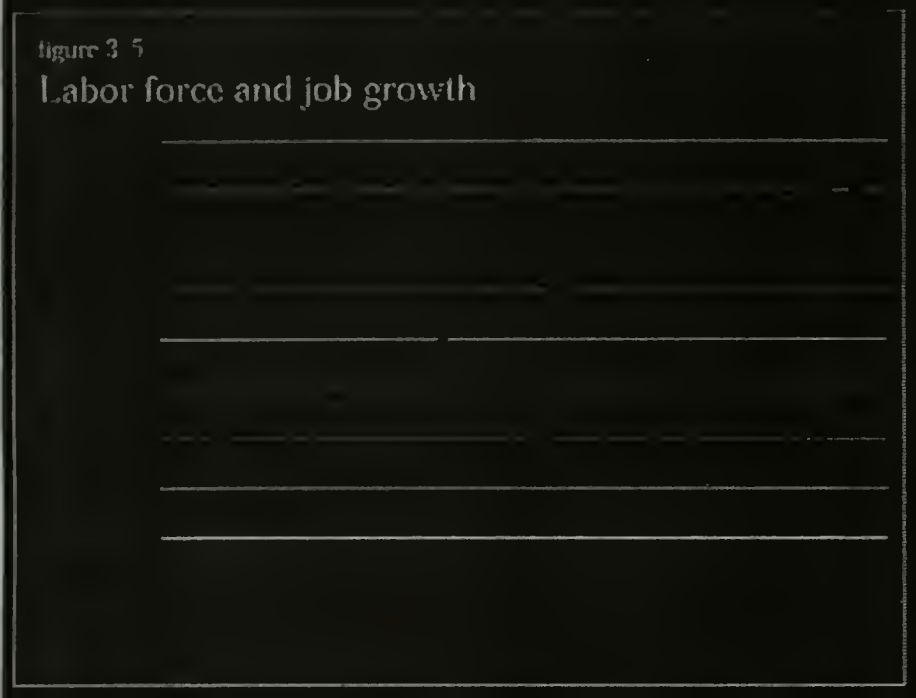
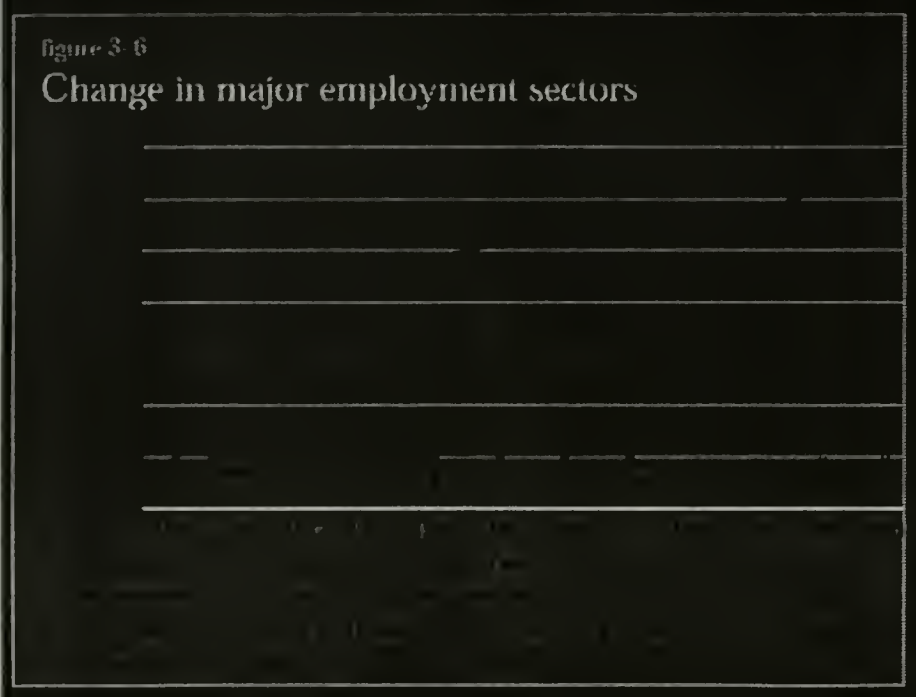


figure 3-6
Change in major employment sectors



This partnership must focus on science and technology as an essential building block of the evolving knowledge worker. Basic education, widespread access to affordable and high quality higher education, ready access to incumbent worker training programs, and systematic advances in science and technology form the core elements of a statewide vision for investing in human capital.

The networked economy - Economic trends in the U.S and Massachusetts suggest that companies are seeking greater flexibility for themselves, their partners, their customers, and their government. The pace of technology as well as employment and migration patterns suggest that the large monolithic corporation is giving way to a set of dense, rich networks of companies and individuals that offer resources and opportunities. These economic networks are the entrepreneurial infrastructure of our export industry clusters and include firms, government agencies, academic institutions, industry associations, financial institutions, and a multitude of specialty providers. Information technology, particularly the Internet, has tremendously leveraged the exchange capacity of networked entrepreneurship. Increasingly, the role of government is to act as the convener of interests, helping establish links in this dense network of resources and opportunities.

The global marketplace - Advances in information and transportation technologies, combined with increased opportunities for trade have opened enormous new commercial frontiers. This market fusion changed the entire framework for economic exchange between regions, both internationally and within nations. The role of knowledge in production has become a truly transnational phenomenon. This creates increased opportunities as well as needs. To effectively compete, states and regions must place increased emphasis on building networks and clusters that trade outside the region. States and regions must also place increasing emphasis on infrastructure improvements, broadband deployment, and regional security.

The increasing importance of place - The mobile knowledge worker, who has more options on where to live than ever, is increasingly drawn to the physical and cultural amenities in a state. Given the strong tradition of "home-rule" in Massachusetts, the importance of place expands the need for state and local governments to work in partnership with firms and citizens to preserve and strengthen the quality of life in local communities. This trend underscores the economic importance of balancing growth with environmental sustainability.

A Shared Vision for Massachusetts in the New Economy

The current economic environment invites a re-examination of the Commonwealth's goals and objectives for economic development.

It takes into account the five original goals outlined in *"Choosing to Compete"* as well as new objectives that emerged in the ensuing decade. This vision must then be realized through a policy framework suited to a knowledge-based economy. Ultimately, the priorities of economic development policy, as well as the composition of performance indicators, must be the product of a thorough political discussion, and defined through ongoing engagement with the public, the business community, and policy-makers.

While the economic landscape underwent dramatic shifts in the past decade, the bottom line for the people of Massachusetts continues to be a high quality of life. This objective broadly defines citizens not only as workers, but also as parents, students, neighbors, and stakeholders in the full range Massachusetts institutions – from its universities to its farms and firms. As in the past, maintaining a high quality of life requires a constant effort to balance the costs and benefits of economic growth, with special attention to regional distributions and the breadth of economic opportunity. Yet people and firms are more mobile today than ever before. *For this reason, an enhanced quality of life emerged as a necessary investment in the future growth prospects for the Commonwealth.*

Quantifying progress toward economic development goals is a challenging task. This is particularly so when considering the level of overlap and linkages between various objectives. The new vision and measurement of state economic performance should include a series of indicators that capture progress towards the achievement of individual goals. Measurement should also acknowledge the complementary, and potentially contradictory, relationship between goals. For instance, job growth needs to be understood within the context of educational opportunities and workforce development. Industrial expansion must be balanced against sustainability *and* environmental considerations.

The vision must bring together the lessons of the past decade and the continued imperatives for a competitive Massachusetts. The vision proposed for the State's business leaders, policymakers, and citizens incorporates the first four elements of *Choosing to Compete* and includes three new key elements – environmental sustainability, healthy and safe citizens, and a strong civic culture. Collectively, these elements form the core of a new vision for economic competitiveness centered on the overarching goal of a high quality of life.

An Overarching Goal: High Quality of Life.

Economic development sits at the nexus of a broad array of quality of life issues that are cultural, social, and communal in nature. Progress in all these areas is not only a basic, but a justified expectation of our citizens. It has become an integral *competitive* factor that underlies the success of our whole economic development strategy. In many ways, quality of life is a meta-goal, incorporating all of our objectives for economic development and requiring a comprehensive set of indicators to accurately represent the State of affairs for our citizens and their communities.

Key Elements: A High Quality of Life
High and rising standard of living
Job growth
Strong regional and community-based economies
Broad economic opportunity
Environmental sustainability
Healthy and safe citizens
Strong civic society

A high and rising standard of living - This is defined as high per capita income relative to regional costs of living. The Commonwealth has made important progress as evidenced by gains in per capita income. However, the rising cost of living in Massachusetts, driven in large measure by dramatic increases in housing prices, has undermined efforts to raise the standard of living of our residents. Per capita and median household income measures are both important. Rising values for both indicate a widely shared rising standard of living.

Performance Indicators: Increasing average and median personal real income – both per capita income and the income of the middle-rung worker, after adjusting for changes in the cost of living.

▸ **Job growth** - This goal incorporates policies that encourage the development of quality, high-income positions in the State and, of equal importance, developing and attracting the human capital necessary for vibrant economic growth in the new knowledge-based economy. The Commonwealth must also develop measures that help attract and retain college graduates as a means to augment the supply of workers and potential entrepreneurs in the 18-24 cohort.

Performance Indicators: Employment growth and the unemployment rate in the State. Employment growth in export industry clusters.

▸ **Strong regional and local economies** - Focused attention must be paid to ensure that economic development takes place throughout the Commonwealth. These efforts must leverage unique strengths and address the particular weaknesses of individual regions. There must be a sustained process of strengthening regional, national – and of particular importance – international linkages that are becoming critical variables in determining economic success.

Performance Indicators: Regional employment levels, employment growth, unemployment rates, and per capita and median real income are the standard measures. Attention should also be given to digital and physical infrastructure growth, and encouragement of innovation and technology centers supporting regional export clusters.

Goal: Strong Regional Economies

Figure 3-6
Real Average Wages by Region, 1990 to 1999

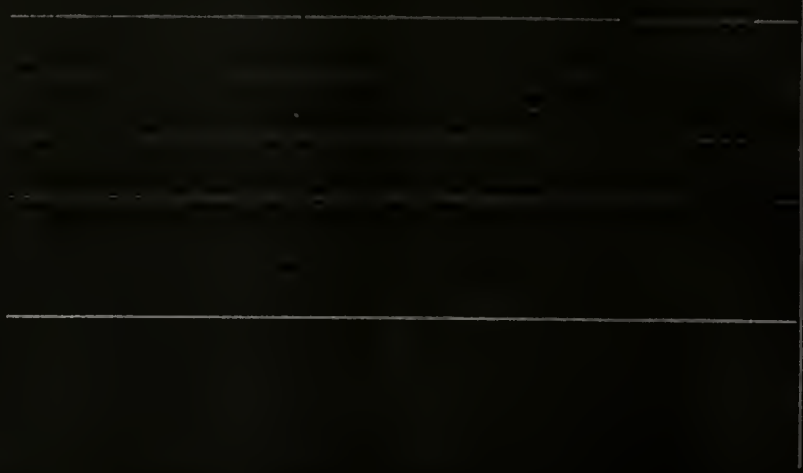


Figure 3-7
Unemployment Rates by Region, 1997 to 2001

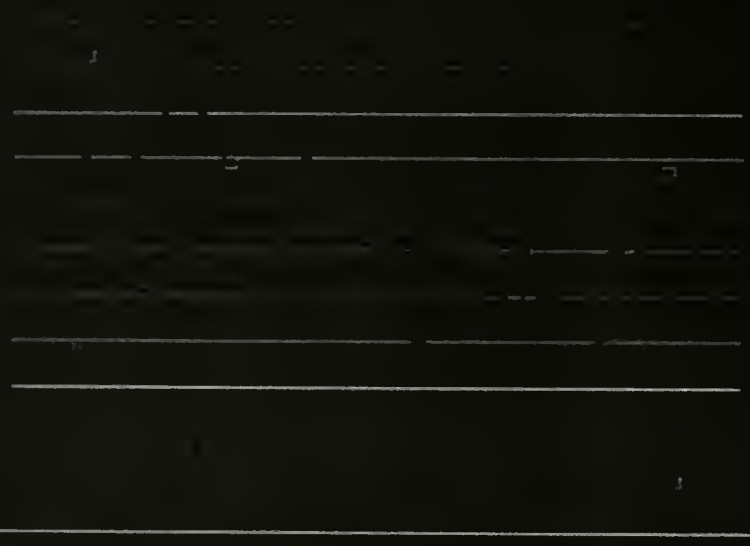


Figure 3-9
Real Median Household Income, by County



figure 3-10
Population Change by
Age Group US and Massachusetts

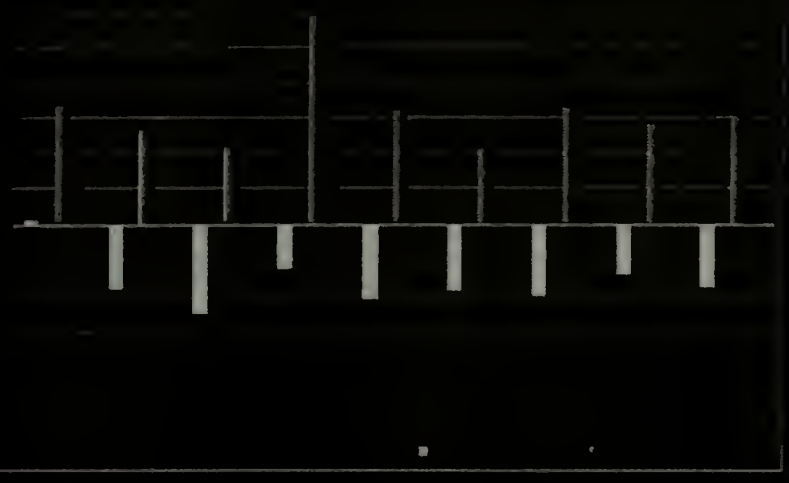


figure 3-11
Venture capital investments in Massachusetts,
inside and outside Interstate 495

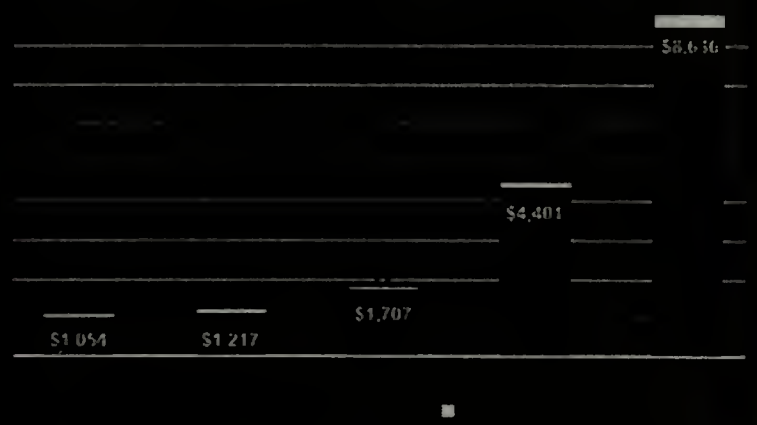


figure 3-12
Statewide unemployment rates
for women and black residents

Goal: Broad Economic Opportunity (continued)

Figure 3-13

Share of Adult Residents with BA/BS Education or More, by County

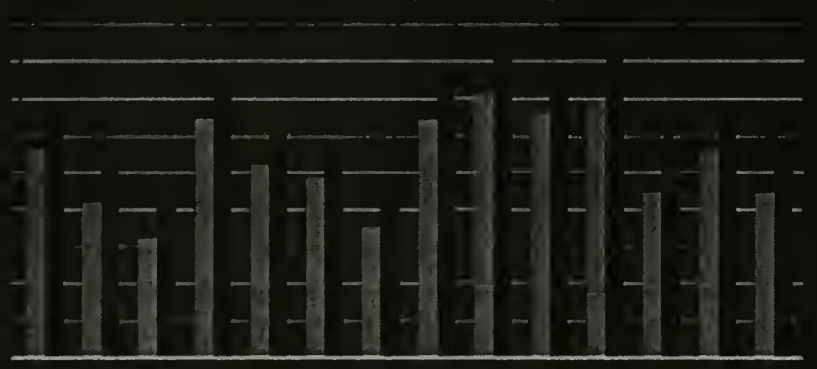
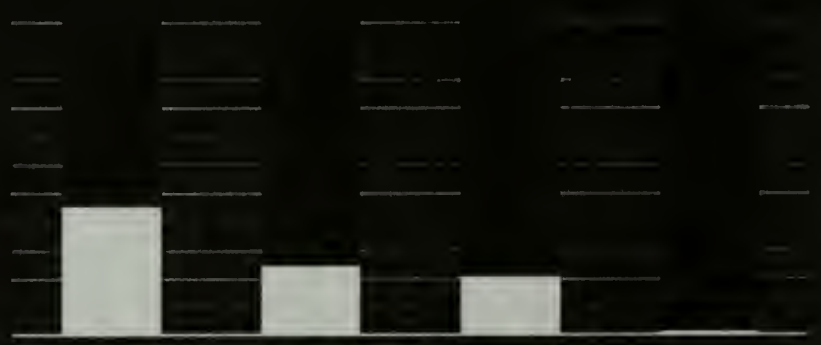


Figure 3-14

Share of All Zip Codes Served by High Speed Internet Service Providers, by Region and Number of Providers



▸ **Broad economic opportunity** - Economic development cannot focus on narrow indicators, but must ensure that the benefits of economic development are widely and deeply spread among all citizens of the Commonwealth. Particular emphasis must be placed on the challenges confronted by minority populations in certain cities and regions. This includes access to financial and educational opportunities, as well as special attention to the "digital divide" and other barriers limiting participation in the emerging networked economy.

Performance Indicators: Employment levels, employment growth, unemployment rates, and per capita income are the standards across different population groups. Measurements for educational opportunity and the size and nature of the digital divide should also be included as indicators of broad economic opportunity.

▸ **Environmental sustainability** - The impact of economic development on the environment must inform all aspects of development planning, from technology infrastructure issues to transportation, land use planning, and affordable housing.[5]

Performance Indicators: Measures of environmental systems, environmental stresses and risks, human vulnerability to environmental impacts, social and institutional capacities, and regional stewardship.

▸ **Healthy and safe citizens** - The physical well being of citizens is a central responsibility of the State, particularly in the wake of the tragic events of September 11. This includes the availability of top health services, homeland security, adequate health insurance for all citizens, crime prevention resources, and measures to mitigate public health and environmental risks.

Performance Indicators: Measures include the percent of uninsured individuals and families, the cost of insurance to individuals, small businesses, and corporations; hospital inpatient and outpatient facilities; police and emergency personnel and resources; crime statistics; environmental risk assessments; and a strategic response to Commonwealth security.

▸ **Strong civic culture** - Social capital refers to the norms and networks that people can draw upon to solve common problems. Networks of civic engagement, such as neighborhood associations, sports clubs, and cooperatives, are an essential form of social capital. These networks have value, as they foster reciprocity and trustworthiness. In doing so, social capital contributes to quality of life and the productivity of our citizens.[6] Massachusetts must continue to place a high priority on building "social capital" within the State, facilitating formal and informal connections between its citizens.

Performance Indicators: Voter turnout in national, state, and local elections; levels of voluntarism; numbers, types, and sizes of community meetings; number of charitable and non-profit service organizations, and community-building organizations (i.e. community newspapers).[7]

Approaching economic development with the central goal of promoting a high quality of life for all citizens in Massachusetts provides the necessary focus for a new strategic framework that will help the Commonwealth grow sustainably and provide an opportunity for all our regions and communities to participate in and benefit from this growth. The following chapter presents a framework designed for use by public and private sector leaders to help maintain and improve the economic competitiveness of their regions and to extend economic opportunity to all citizens of the Commonwealth.

---

[5] Indicators taken from *"Pilot Environmental Sustainability Index: An Initiative of the Global Leaders for Tomorrow Task Force,"* World Economic Forum, January 2000. The "Index" was developed as a collaborative effort between the Yale Center for Environmental Earth Science Information Network (CIESIN) of Columbia University. The Index is meant to serve as a corollary to Gross Domestic Product and to provide countries with relative comparative measures of economic development and environmental sustainability. A similar Index could be developed to measure U.S. State progress towards environmentally sound development policies.

[6] Robert Putnam, *Bowling Alone: The Collapse and Revival of American Community.* Simon and Schuster, 2000. See Chapter 1 for a review of social capital.

[7] Ibid. Note that several of these indicators are the result of survey instruments, while others come from selected data sources.

Goal: A High Quality of Life

figure 5.15
Pollutants Reduction in Massachusetts

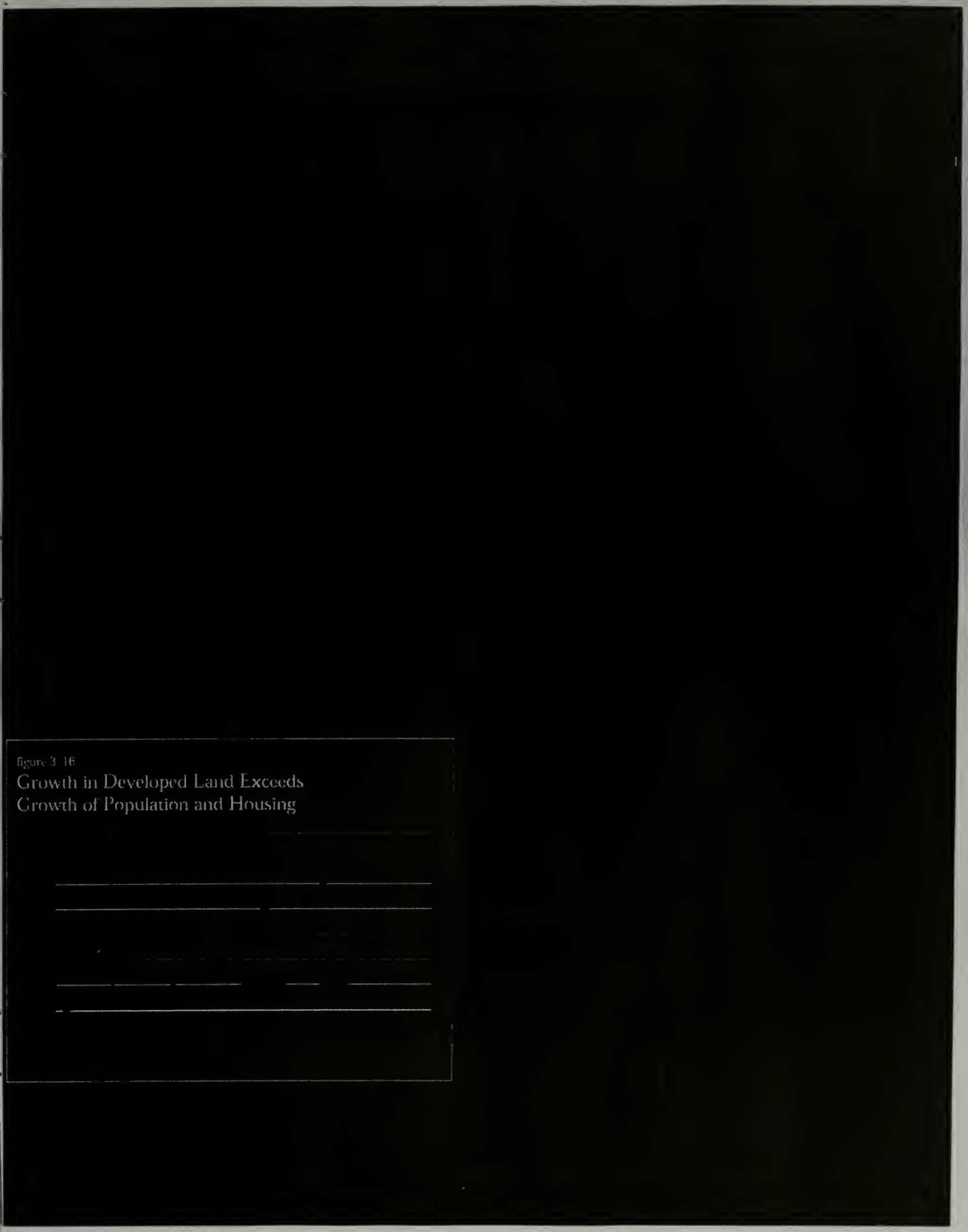


Figure 3-16
Growth in Developed Land Exceeds
Growth of Population and Housing

chapter 1

a strategic framework for economic growth:

Choosing to Compete demonstrated that all of the stakeholders in economic growth - business, labor, government, academic institutions, and community groups - can collaborate to implement policies that promote economic competitiveness. In this chapter, we offer a new strategic framework for the Commonwealth. The framework consists of six "competitive imperatives," or issues the Commonwealth must address to ensure prosperity over the long term. This framework, along with a vision for economic development, will help orient economic stakeholders to a common course of action.

The overarching objective of this strategic framework is a high quality of life for all citizens of the Commonwealth, the vision we propose in Chapter 3. This includes the traditional economic development goals of job growth and high and rising incomes. It also insists upon a shared prosperity and broad economic opportunity among diverse population groups and regions of the State and a sustainable prosperity that advances environmental and civic objectives (see sidebar, *Toward a New Prosperity: A Shared Vision for the Commonwealth*).

As described in Chapters 1 and 2, we can only realize this vision by enhancing the competitiveness of the Commonwealth and of each of our regions. Vibrant export industry clusters are today's primary engines of economic growth. The comparative advantage of the Commonwealth lies in our rapidly growing knowledge-based export industries. Chapter 2 identified four factors that underlie the ability of these export industries to generate a continuing stream of innovations and productivity gains:

- Knowledge workers
- Networked entrepreneurship
- Responsiveness to the opportunities created by globalization
- Attention to the importance of place

These four factors are the critical points of leverage in our strategic framework for economic development.

A Strategic Framework for Economic Growth in Massachusetts

Three principles form the foundation of our framework: First, government is most effective when it provides a healthy environment for business, not when it intervenes in the competitive process. The competitive success of the export sector is the dominant factor driving the Commonwealth's overall economic prosperity (to learn more about the Commonwealth's export industry clusters, see Chapter 2). But market forces are best at determining where the best opportunities lie. Thus, government should not pick winners and losers. Nor should it target specific industries or regions for the presumed common good. Government, instead, should focus on strengthening the economic foundation of all regions in the Commonwealth. In today's economy, it should provide tools and resources to leverage the four critical success factors and support the

development of vibrant export industry clusters throughout the Commonwealth.

Second, each region and industry cluster in the Commonwealth faces its own unique set of opportunities and challenges. There is no simple "one size fits all" economic development solution. Each region and cluster must identify initiatives that best respond to its particular needs. In essence, the Commonwealth needs a flexible strategic framework – a growth agenda that is responsive to different economic conditions and local challenges.

Third, a shared leadership process is the best way forward. Business, labor, government, academic, and community groups increasingly use networks and collaborative, networked entrepreneurship to improve operations and bring innovative products to market. These networks provide access to funding, to business and employment opportunities, and to critical technical and market information. Government can make a significant contribution by establishing, nurturing, and *participating* in these networks. Government should use these networks to gather and share information, to improve access to public-sector resources and expertise, and to involve the larger community in economic development decisions.

Competitive Imperatives for the Commonwealth

The six competitive imperatives represent a set of strategic challenges the Commonwealth must confront if it is to enjoy long-term prosperity. Accordingly, the imperatives impart broad direction and urgency to the Commonwealth's economic development efforts. The imperatives also provide a framework that links specific policy options to a shared vision for the Commonwealth.

Imperative No. 1: Improve the Business Climate to Support All Industry Clusters

Vibrant and innovative industry clusters are the primary engines of economic development. This is especially true in the Commonwealth's networked, knowledge-based economy. Massachusetts must focus its energies on developing strong export industry clusters throughout the State. This imperative suggests two desired outcomes:

▸ **Desired Outcome: Strong export industry clusters throughout Massachusetts.**

Vibrant industry clusters that export goods and services beyond the region or the Commonwealth are the primary long-term drivers of economic growth (See Chapter 2). Current economic development efforts focus excessively on specific industries, regions, or target areas. Some industries and locations get far more attention than others. Too few initiatives promote competitiveness more broadly across all industries and regions.

▸ **Desired Outcome: Firms in export industry clusters continually innovate to meet high value customer needs most effectively.**

Every firm must leverage its innovative capacity to compete in today's increasingly fast-paced and highly competitive marketplace. Globalization only increases these pressures on Massachusetts firms. Capacity for innovation and productivity gains is not, however, equally present in all industries and regions of the Commonwealth. Much of our employment growth in the 1990s was concentrated in a limited number of knowledge-intensive clusters in or around Greater Boston. Many Massachusetts firms in these high-growth industries are less mature and are poorly linked to our institutions of higher education – the Commonwealth's most critical competitive resource. Strengthening networks and opportunities for networked entrepreneurship will help improve the business climate, foster innovation and rising productivity, and enhance economic opportunities for all regions of the Commonwealth. To learn more about networked entrepreneurship, see Chapter 2.

Imperative No. 2: Support Entrepreneurship and Innovation

Entrepreneurship and innovation – important in any economy – are especially critical in fast-moving, networked, knowledge-based economies. We must strengthen the Commonwealth's innovation infrastructure by improving channels of communication and access to resources and by reducing regional disparities in business opportunities and access to capital. We must create a climate across the Commonwealth in which entrepreneurs can thrive. This imperative points to three desired outcomes:

▸ Desired Outcome: A statewide climate where entrepreneurs flourish.

Entrepreneurship and innovation, supported by our knowledge creation infrastructure, are the foundation of the Commonwealth's economy. Today, Massachusetts enjoys formidable capacity in both areas. But competition from other states and other regions, and worldwide competition, may diminish our competitive advantage in the future. We must protect and extend these advantages to all our regions of the Commonwealth if Massachusetts is to retain its leadership in technical innovation and entrepreneurship.

We can strengthen our entrepreneurial environment by enhancing links between the business community and State government, by fostering communication, by improving access to the resources available in the Commonwealth, by increasing speed and lowering the costs of transactions with government, and by enhancing opportunities for under-represented regions and populations.

▸ Desired Outcome: Reduced disparities in entrepreneurial opportunities.

Business opportunities and funding remain concentrated in the eastern portion of the Commonwealth. Trends in Small Business Innovation Research Grant (SBIR) awards show a similar geographic imbalance. The Greater Boston region has a particular regional specialization which provides opportunities for other regions in the State through potential inter-regional linkages. However, women and minorities may be under-represented, especially in regions beyond greater Boston. In the United States, one woman is involved in entrepreneurship for every two men. Also, women and minorities frequently lack access to networks providing financing and professional services.[1] Successfully connecting entrepreneurs throughout the Commonwealth to funders, researchers, business service providers, and other critical resources, will also enhance the capacity of our entrepreneurial networks and boost the and innovative capacity of the larger Massachusetts economy.

▸ Desired Outcome: A strengthened technological innovation infrastructure.

Our knowledge creation facilities and entrepreneurial networks, which convert such knowledge into practical innovations, are the among Commonwealth's most important assets. Competing states, however, are making substantial investments to create or upgrade their university research facilities. Massachusetts has traditionally relied heavily on federal R&D funding. However, the Commonwealth's relative share of these funds is declining. Between 1996 and 1998, federal R&D funding in Massachusetts grew more slowly than in competing states – and much more slowly than in states with relatively new programs.[2] The Commonwealth must find new resources and ways to maintain and build upon its strong infrastructure for knowledge-based innovation to enhance our long-term competitiveness.

Imperative No. 3: Prepare the Workforce of the 21st Century

The quality of our workforce will increasingly determine the extent of the Commonwealth's economic success. In a technology-based, innovation-led economy, people and the skills they possess are fundamental to the creation of economic value. Our firms must have access to the talent they need. Our workers must have skills that match the opportunities emerging in the competitive marketplace. Programs that train these workers and expand the Commonwealth's base of knowledge workers will help both firms and workers. As such, they are essential elements of efforts to promote long-term growth and competitiveness. We must view this imperative from both the employer and employee perspective, framed as two desired outcomes:

▸ Desired Outcome: Firms have access to the talent they need to succeed.

The Commonwealth's employers, especially in knowledge intensive industries, continually have difficulty finding and retaining workers with particular skills. In spite of the recent recession, shortages of engineers and information technology professionals remain. Currently, the education and health care sectors have tremendous difficulty locating and retaining replacements for retiring teachers and nurses. These skill shortages pose especially serious challenges to firms seeking to locate or grow in the Commonwealth. The Massachusetts Division of Employment and Training projects

that the largest number of new jobs in the Commonwealth will emerge in occupations requiring additional education, mostly at the BA/BS level, or higher.[3]

The Commonwealth should work to strengthen partnerships among employers, primary schools, community colleges, and universities to give workers the skills needed to function in today's economy. Enhancing access to affordable, high-quality, higher education will be essential if this challenge is to be met. Our educational institutions must provide "work ready" graduates who possess appropriate technical skills such as the ability to read, write, and compute, as well as the "soft" skills needed to function effectively in teams.

▸ Desired Outcome: Worker skills match the needs of business and the competitive environment.

Today, too many of our workers lack the educational background needed to compete in the current economy. Others have limited earning capacity because they have not been prepared to think critically, solve complex problems, communicate effectively, or use computers and other technologies.

Once on the job, unrelenting market pressures require our workers to develop new skills and adapt to a fluid labor market throughout their careers. In this dynamic market, workers change employers and even careers with increasing frequency. Thus, the Massachusetts workforce development system must effectively coordinate job-training resources. The Commonwealth's One-Stop network is intended to do that, serving as the point of contact for both employers and job seekers. But the lack of a coherent strategy, effective outreach, resources, and coordination of these services restricts access to training and employment services for both businesses and workers. These restrictions would be eased through improved system coordination and a more explicit integration of the State's workforce development and higher education systems.

Imperative No. 4: Build the Information Infrastructure of the 21st Century.

Globalization means enhanced access to opportunities and resources throughout the world. In the coming decade, the breadth and reach of the State's information infrastructure will be a critical factor determining our access to those opportunities and resources. Therefore, we must facilitate access to affordable, competitive, broadband options throughout the Commonwealth.

Universal and affordable broadband access will enhance the Commonwealth's competitiveness in various ways. It will expand the size of the State's entrepreneurial networks. This will facilitate firm formation and expansion, especially in currently unserved areas. Affordable options will also give these businesses better access to market opportunities around the world. Finally, affordable broadband will improve the quality of place for firms, knowledge workers, and the people of the Commonwealth. This imperative has one desired outcome:

▸ Desired Outcome: Access to affordable, competitive-broadband options throughout the Commonwealth.

Success requires a shared vision for broadband deployment. Today, business and government lack a common idea of how to deliver affordable broadband service to all regions of the State. This vision is difficult to develop as market, regulatory, and technology factors all shape the status of broadband deployment in the Commonwealth. Conflicts between immediate and longer-term needs further complicate efforts to define a common approach to broadband deployment.

Massachusetts' deregulated telecommunications industry relies on private, market-driven investment to "build out" its telecommunications infrastructure. To date, this approach has yet to deliver affordable broadband options to less densely populated and less affluent communities. The recent retrenchment in the telecommunications industry complicates matters, as it limits the capital available for necessary infrastructure investment.

Imperative No. 5: Ensure that Economic Growth is Compatible with Community and Environment

Massachusetts must develop sufficient housing and commercial/industrial space to accommodate a growing economy. At the same time, we must implement sustainable growth strategies that protect our environment and ensure a high quality of life in our cities and towns.

---

[1] William Bygrave, Dean Shepherd, and Andrew Zacharias, *Global Entrepreneurship Monitor: National Assessment, the United s of America – 2000 Executive Report.* Kauffman Center for Entrepreneurial Leadership at the Ewing Marion Kauffman Foundation, 2000. Pgs. 9 and 15.

[2] Massachusetts Technology Collaborative, *Maintaining the Innovation Advantage: The Case for Creating a Massachusetts Science & Technology Policy,* August 2001, pp. 10-11.

[3] Massachusetts Division of Employment and Training, Economic Analysis Department, *Massachusetts Employment Projections through 2008: A Focus on the Jobs, the Industries, and the Workforce,* 2000, p. 8.

Rapidly rising costs for housing and other forms of real estate have hampered the Commonwealth's growth. Recently, the jump in home prices in many parts of Massachusetts has been a serious hardship for workers wanting to move into the Commonwealth, and for many Massachusetts families wishing to purchase their first home.

Successfully addressing these issues will not only improve our quality of life, but will also enhance the State's economic competitiveness. Attending to both economic development and the quality of place will increase the Commonwealth's attractiveness to businesses and knowledge workers who demand a high quality of life in the places they choose to locate. This imperative requires attention to two desired outcomes:

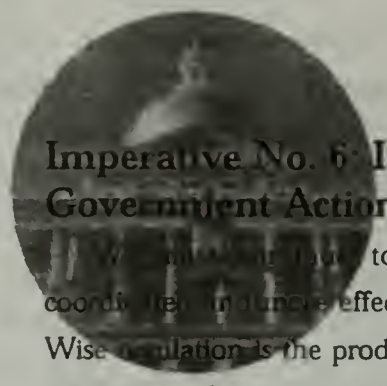
Desired Outcome: Massachusetts is a leader in implementing development strategies that preserve a high quality of life.

Current development planning suffers from a lack of coordination among impacted parties. At the State level, critical transportation infrastructure investments are largely made independent of broader economic development and growth planning considerations. The Commonwealth also has a long-standing tradition of local control that gives our cities and towns significant authority over many matters related to growth. Our communities, however, often lack sufficient trained staff to keep pace with evolving federal and State regulations governing growth and infrastructure decisions. They also lack the resources necessary to support their planning and/or zoning boards, resulting in substantial delays in evaluating proposed developments.

Improved coordination of State and local planning bodies will add coherence to development practices and focus incentive systems to reverse the trend toward costly, low-density development. This will improve the sustainability of growth and the quality of life throughout the Commonwealth.

Desired Outcome: Massachusetts implements housing affordability solutions to support growing businesses and their employees.

Rising home values are boosting homeowner wealth. However, young, low-income, and middle-income workers find it increasingly challenging to find an affordable home within a reasonable commuting distance from work. As a result, employers frequently find it hard to attract the workers they need. An ample housing stock should help moderate price increases and make the State more attractive to such workers and their employers.



Imperative No. 6: Improve the Outcomes of Government Action.

[illegible] to seek wise regulation and better coordination to produce effective services and business assistance. Wise regulation is the product of business and government seeking improved mutual outcomes from regulation. The needs of small businesses are especially acute. The Commonwealth must also swiftly and effectively respond to emerging terrorism threats and maintain confidence in the basic infrastructure linking global production, communication, and transportation networks.

Desired Outcome: State government provides more effective and better-coordinated services and resources to businesses, particularly small businesses.

The Commonwealth is active in many policy areas that shape the lives of its citizens and businesses. One unanticipated consequence has been the proliferation of agencies and quasi-public organizations with closely related and often overlapping missions. This approach has benefits, including specialized expertise and flexibility. Unfortunately, these benefits are too frequently accompanied by a lack of accountability and effectiveness. Too many agencies issue regulations and provide outreach and technical support. This fragmentation makes it hard for business, especially small business, to understand government programs and access its services and resources. Thus, government should fashion, deploy, and market comprehensive responses specifically designed for our economic development needs.

Desired Outcome: Business and government develop "wise" regulations.

The shift toward a more collaborative regulatory model improved the quality of government action and compliance on the part of business. Nevertheless, we must do more. Improved coordination and a periodic review of all regulations can update, simplify, or eliminate many redundancies and contradictory requirements. Regulations should also be sensitive to the size of the business expected to comply. Small businesses lack the resources needed to keep pace with regulations and their changes – especially regulations that are difficult to find and interpret.

A comprehensive assessment of the Commonwealth's regulatory climate is needed and mechanisms to help our regulatory agencies improve their effectiveness must be developed. While collaborative approaches improve regulation and the regulatory climate, they tend to focus the attention of both

business and government on compliance issues. It is important to remain focused on the problems that led to regulation in the first place. The Commonwealth needs more efficient regulatory mechanisms and better ways to expand regulatory flexibility.[4]

Desired Outcome: Massachusetts is widely recognized as a leader among states in developing innovations in government.

Leadership in regulatory matters will create significant value for our citizens and businesses and free up private sector resources formerly devoted to compliance. Leadership in program design and service delivery will support business more effectively, providing more information, services, and resources while lowering transaction costs. A productive and efficient government – with a focus on economic development – is a significant competitive advantage. The fundamental purpose of this report is to move the Commonwealth in this direction.

Desired Outcome: Massachusetts enhances the competitiveness of its regions by reducing costs affecting all businesses.

Governments help shape a region's competitiveness through the provision of services, regulations, and incentives – all of which influence costs borne by business. Governments can contribute to these costs directly, through decisions relating to taxes and fees, as well as indirectly, through budget or staffing decisions that can reduce or enhance business efficiency or raise or lower transaction costs. Efficient service delivery can lower transaction costs and improve predictability and help all businesses focus their resources on competition and growth.

Desired Outcome: Massachusetts has a well-coordinated and effective response to terrorist attacks.

The September 11 attacks generated a great deal of anxiety about the Commonwealth's readiness to effectively respond to a terrorist attack. An attack could imperil the lives of citizens and substantially damage the State's economy. Government must anticipate and plan for such attacks and prevent them where possible. Should an attack occur, government must respond quickly and effectively mitigate any adverse impacts. More broadly, government must restore confidence in the safety and security of our infrastructure networks and the continuing vitality of our economy. Our knowledge-based export clusters and travel and tourism industries, in particular, depend on a safe and secure infrastructure – and on the perception of safety and security. The larger economic and entrepreneurial sector also needs to understand the fiscal implications of State government's new security obligations.

A Framework for Action

Part III of this report is designed to provide all stakeholders – business, labor, government, academic institutions, and community groups – with a set of policy options to help advance this strategic framework. Part III further organizes these ***desired outcomes*** into more targeted ***enabling policy options*** and ***success measures*** that could help advance a shared vision for the Commonwealth's economic future. Part III is designed as a resource for those in the public, private, and non-profit sectors who are actively advancing economic development initiatives for the Commonwealth and/or its seven constituent regions.

The strategic framework presented in this document is meant to serve as a springboard for future leadership. We hope that the framework presented here helps structure a debate that is constructive and moves the Commonwealth *Toward a New Prosperity.*

[4] Andrew Hoffman, Hanna Riley, John G. Troast, Jr. and Max Bazerman et al. (2000) "Cognitive and Institutional Barriers to New Forms of Cooperation on the Environment: Insights from Project XL and Habitat Conservation Plans."

greater boston region



Today, Greater Boston is widely recognized as one of the most innovative economic regions in the world. It is home to some of the world's finest institutions of higher education, which has generated a tremendous concentration of science and technology related research and development. These intellectual resources, combined with its rich historical heritage and extensive cultural resources, make Greater Boston the center of much of the economic activity in the Commonwealth. For the purposes of this analysis, we define Greater Boston as the communities indicated in the map (see above). The Region includes all of Suffolk County, a large share of Middlesex and Norfolk counties, and portions of Plymouth and Essex Counties.

By size alone, the Greater Boston Region is the critical economic engine of Massachusetts. It is home to half the State's workforce and jobs. According to the Bureau of Economic Analysis, the personal income generated by the residents of Suffolk, Norfolk and Middlesex Counties alone accounts for more than 50 percent of the State total.

The knowledge-intensive export clusters that drive the larger economy of the State are concentrated in Greater Boston. These export clusters, as presented in Chapter 2, are:

• **Knowledge Creation.** This industry cluster is fueled by world-class institutions of higher education that bring income into the Region in the form of payments for tuition, room, board, and ancillary items for out-of-state students; and by a diverse array of legal, scientific, engineering, and management service industries that generate substantial fees from out-of-state clients.

• **Information Technology.** The Region is widely recognized as a global leader in the broad computer and communications technology cluster, which includes many of the world's largest, most dynamic knowledge-based industries.

• **Financial Services.** Greater Boston is home to some of the largest and most influential financial firms in the world, espcially in the rapidly expanding mutual fund and money management industries.

• **Health Care.** The presence of numerous world-class teaching hospitals and academic research centers not only attracts out-of-state patients and research funds, but has sparked the rapid development of the related medical device and biotechnology sectors.

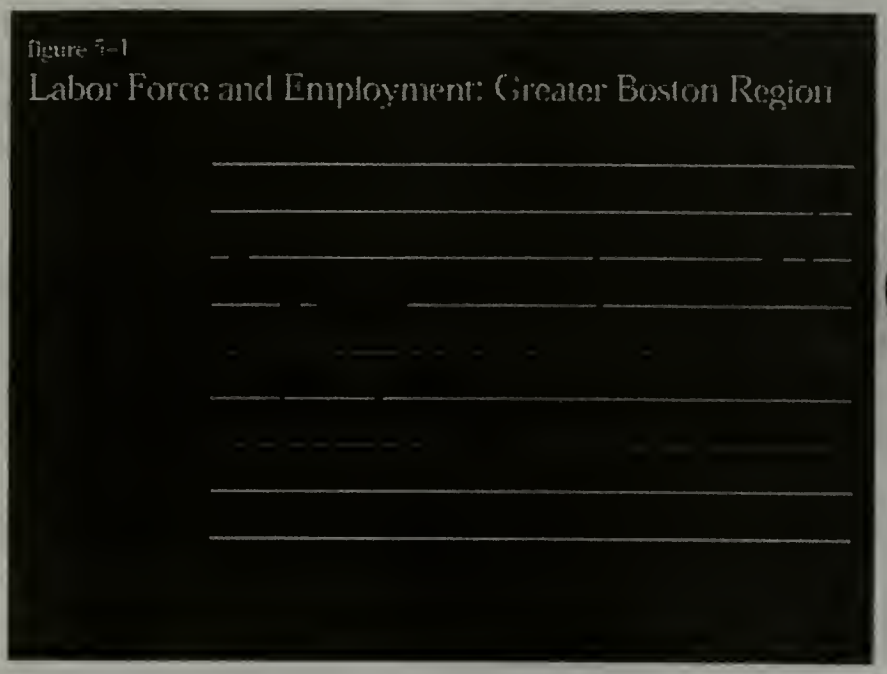
While the Greater Boston economy is large, diverse, and clearly successful, significant challenges remain. Much of the Region's economic growth during the 1990s benefited high-wage, educated workers and was concentrated in its outer ring, between Routes 128 and 495. Many workers without a college education did not share in this prosperity. Nor did its older industrial cities within Route 128, such as Chelsea, Everett, Lynn, Revere, and Saugus. Overcoming

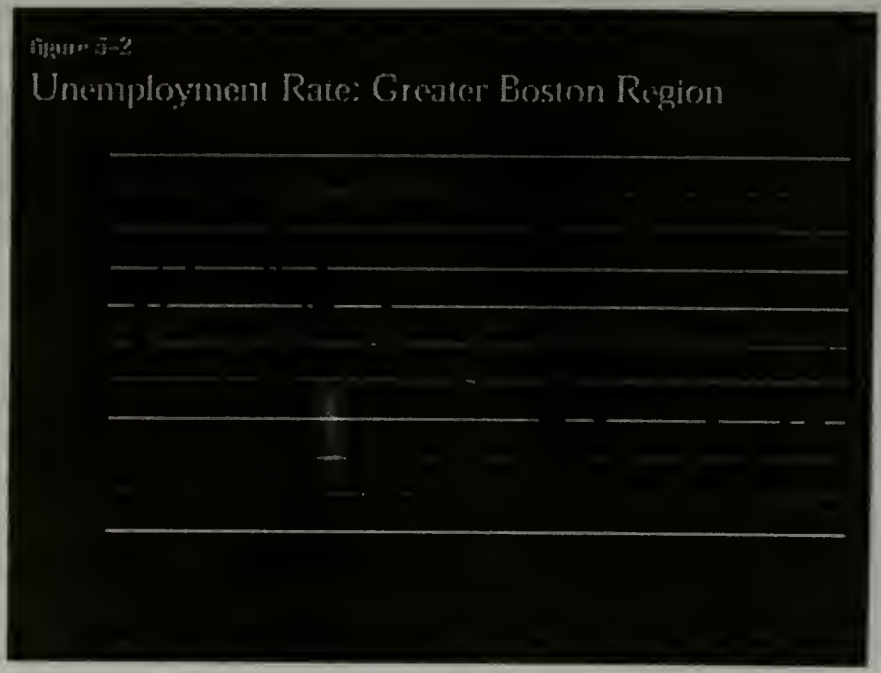
these educational and spatial barriers will be critical if the benefits of economic growth are to be distributed more broadly in the future.

The locus of economic development has moved to less densely-populated parts of the Region Commonwealth. Concurrently the price of housing has risen even faster than incomes. As a result, a housing "affordability gap" has widened throughout the decade, impeding the Region's ability to grow. The workforce increased by a modest 3.6 percent over 1990–2001, much slower than the Region's 12.2 percent rate of job growth, and almost all workforce gains came in 2001. While payroll employment and the workforce grew faster in Greater Boston than in the Commonwealth, population growth actually lagged, rising 4.9 versus 5.5 percent for the rest of the State. While the region supplies half of the jobs in the Commonwealth, it has less than half the population. Due to its uneven pattern of economic development, this population has also grown unevenly, with the population of some cities and towns flat or declining, while others have seen tremendous growth.

Sub-Regional Analysis

The I-495 West sub-region has emerged as an important location for the new knowledge-based clusters. For this reason, the following analysis highlights the I-495 West sub-region. As shown on the map, the sub-region follows I-495, from Littleton in the north to Franklin in the south. Note that several of the communities in the I-495 West sub-region lie outside the Greater Boston Region.


figure 5-1
Labor Force and Employment: Greater Boston Region

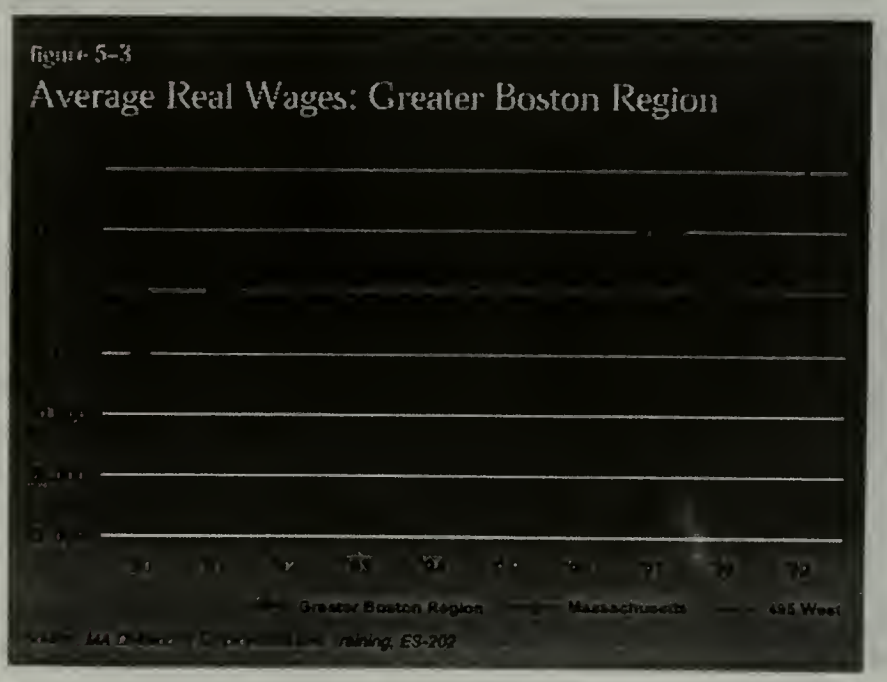

figure 5-2
Unemployment Rate: Greater Boston Region

Economic Overview

Employment[1]

The Greater Boston Region accounts for more than half of the jobs in the Commonwealth. Over the 1990–2001 period, the workforce increased by a modest 3.6 percent. Almost all of this growth came in 2001, as the Region needed much of the decade to recover job losses incurred during the early 1990s recession. This is the same rate of growth as the statewide workforce.

Over the past decade, the Greater Boston unemployment rate has always been below that of the State, reaching a low of 2.2 percent in 2000 before rising to 2.85 percent in 2001(see figure 5-2). This low level of joblessness has not been uniform across the Region. The I-495 West sub-region has had an unemployment rate around 0.2 percentage points below the Region as a whole. Several communities continue to experience higher unemployment rates, such as Chelsea (3.9 percent), Hull (3.4 percent), Revere (3.4 percent), and Everett (3.0 percent).[2]


figure 5-3
Average Real Wages: Greater Boston Region
Greater Boston Region
Massachusetts
495 West

[1] The data in this section on the number of people employed, in the labor force, and unemployed are taken from the household survey. They therefore will not match the employer-based data used in other sections that report the number of payroll jobs.

[2] Steven Winter. *MAPC Comprehensive Economic Development Strategy 2002*, December 2001.

Figure 5–4
Employment by Major Industry: Greater Boston Region

Figure 5–5
Change in Employment, by Major Industry, Greater Boston Region: 1993 to 2000

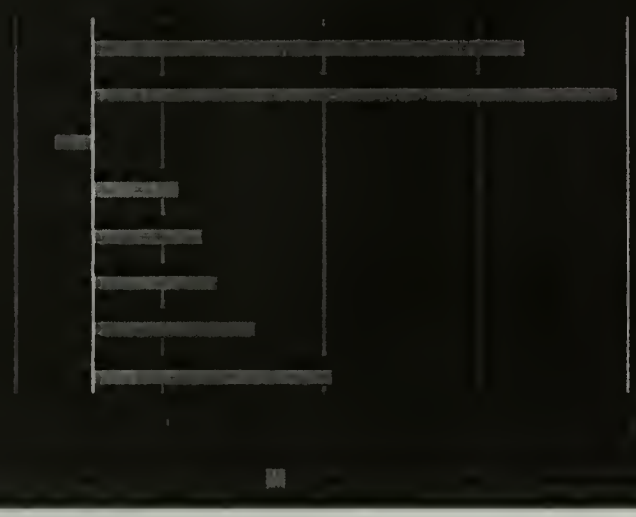
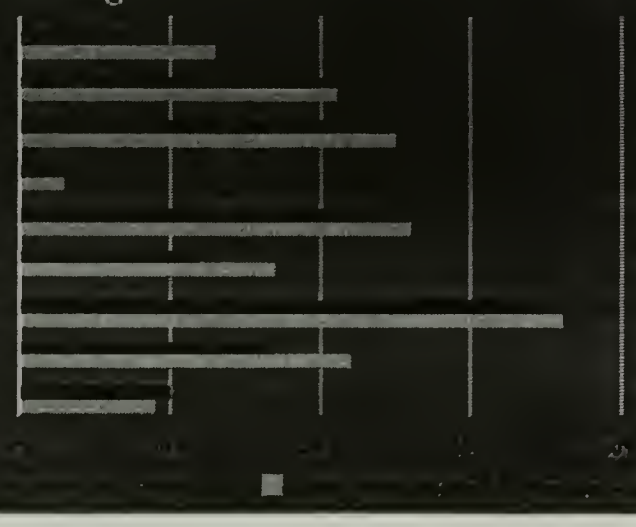


Figure 5–6
Change in Real Average Pay, by Major Industry, Greater Boston Region: 1993 to 2000



Income

Income growth in the Region has not kept pace with the surge in housing prices, creating an estimated "affordability gap" of $31,460 in 1999 (see figure 3-3). This gap has steadily widened. Jobs in the Greater Boston Region generally pay much better than jobs in the rest of the State (see figure 5-3). Average wages in Greater Boston were 9.5 percent higher than those in the State in 1990, and this gap had increased to 13 percent by 2001.[3] In the I-495 West sub-region, wages were even higher, though the size of this gap with the Greater Boston Region declined during the past decade.

Employment by Major Industry Sector

In 2000, the largest industry sector in terms of employment[4] in the Region was services, followed by wholesale and retail trade, manufacturing, and Finance, Insurance, and Real Estate (FIRE). The industry mix changed during the economic expansion between 1993 and 2000. Notable are the increases in services and FIRE, at the expense of manufacturing and some government employment. Overall, employment grew 20.7 percent during this period, with services growing 30.7 percent, trade (wholesale and retail) 15.4 percent, and construction 67.5 percent (see figures 5-4 and 5-5). In the I-495 West Region, services employment dominated growth, rising by over 30,000 jobs, or 62 percent.

Comparisons with the State over the period 1993-2000 show the growth of employment in construction and agriculture far exceeding their statewide averages. Most of the large increase in construction can be attributed to the Central Artery Project, increasing demand for home building services and commercial space. The expansion of home yard service companies also boosted growth in the agricultural sector. The more rapid expansion of the FIRE sector is almost all due to growth in the mutual fund and brokerage industries. It is also worth noting the steeper decline in manufacturing employment in the Region as compared to the State and the much slower increase in government employment (see figure 5-5).

With the exception of the transportation and government sectors, real average pay growth matched or exceeded statewide growth in each of the Region's industry sectors.

The downsizing of regional manufacturing also shows up in the layoff data. Between 1993 and 1998, 50 percent of jobs lost to plant closing or permanent layoffs in the Metropolitan Area Planning Commission Region (which is slightly larger than the Greater Boston Region) were from the manufacturing sector. In Greater Boston in 2001, 35.5 percent of layoffs were in manufacturing, over three times its share of total employment. This is in contrast to services (35 percent), where layoffs more closely approximated their relative proportion of employment in the Region (see figures 5-4 and 5-7).

The Greater Boston Region Export Sector

As explained in Chapter 2, a healthy export sector is critical to a Region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's export sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[5] and the more recent *Knowledge Sector Powerhouse.*[6] They include four knowledge-based clusters – Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive: Travel and Tourism and "Traditional Manufacturing" (manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery that are not part of the Information Technology or Health Care clusters). The discussion below uses this framework to explore the Region's export sector (see figure 5-8).

Figures 5-8 and 5-9 show export cluster growth in the Region and sub-region, as compared to Massachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The Health Care cluster, for example, includes physicians serving the local population. A finer picture of the composition of the Region's export sector, and the extent to which the Region has become part of the wider knowledge-based economy, is developed in the discussions that follow. Also, note that some of the following charts show no data for some industries in the export clusters. This does not necessarily mean that the industry is absent. Federal rules prohibit access to data that could provide information about individual firms. The lack of industry data could be due to this limitation.

figure 5–7

Layoffs, by Industry: July 2000 to June 2001
Greater Boston Region

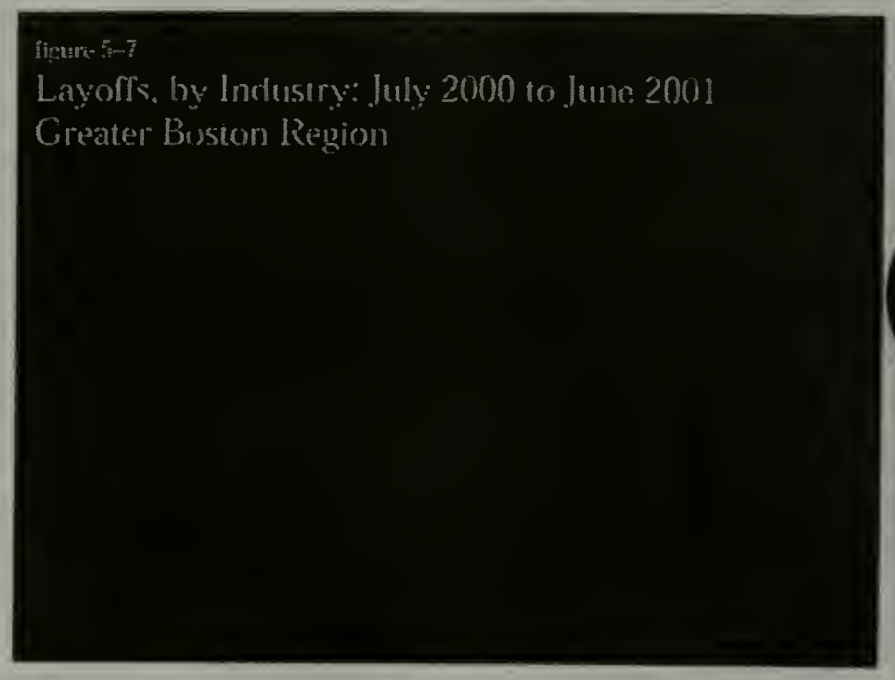


figure 5–8

Employment Change in the Commonwealth's Export Clusters: Greater Boston Region, 1993 to 2000

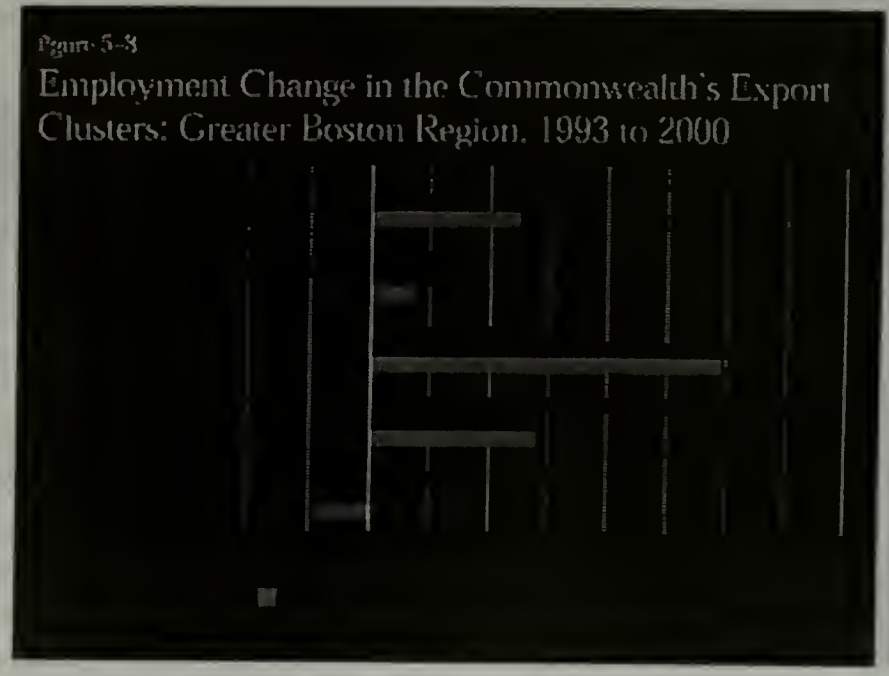
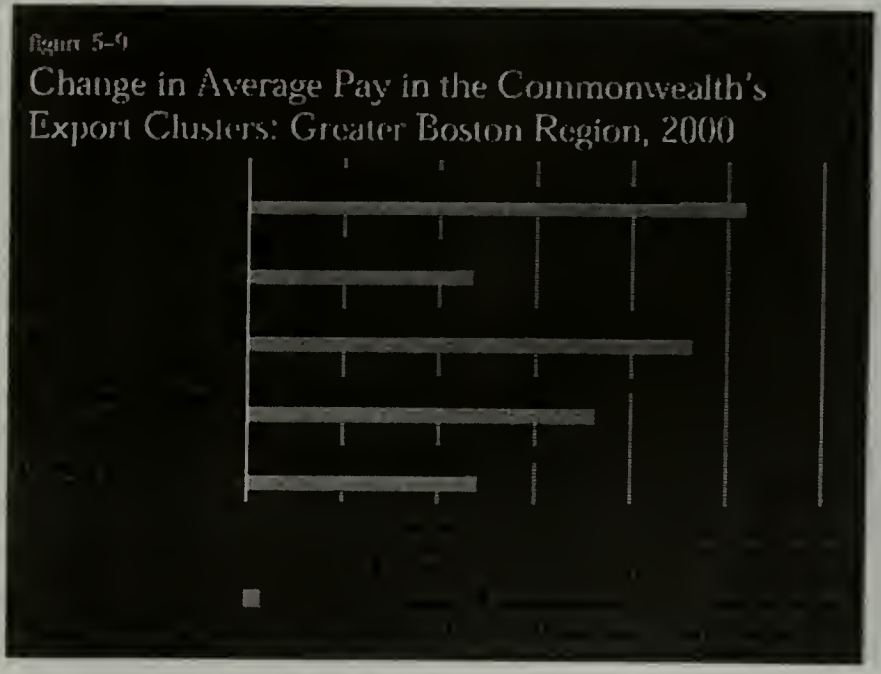


figure 5–9

Change in Average Pay in the Commonwealth's Export Clusters: Greater Boston Region, 2000



[3] The U.S. consumer price index (CPI) was used to adjust nominal wages for the effects of inflation.

[4] Employment is measured here using the Bureau of Labor Statistics, ES-202 series, which are employer reports of payroll jobs rather than household-based measures of employed or unemployed people. As a result, the numbers will differ from employment figures based on the household survey presented in other sections of the document.

[5] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts, (Boston:, 1993).

[6] Robert Forrant, Philip Moss, and Chris Tilly, (Boston: UMass Donahue Institute, 2001).

figure 5-10
Knowledge Creation: Change in Employment, Greater Boston Region: 1993 to 2000

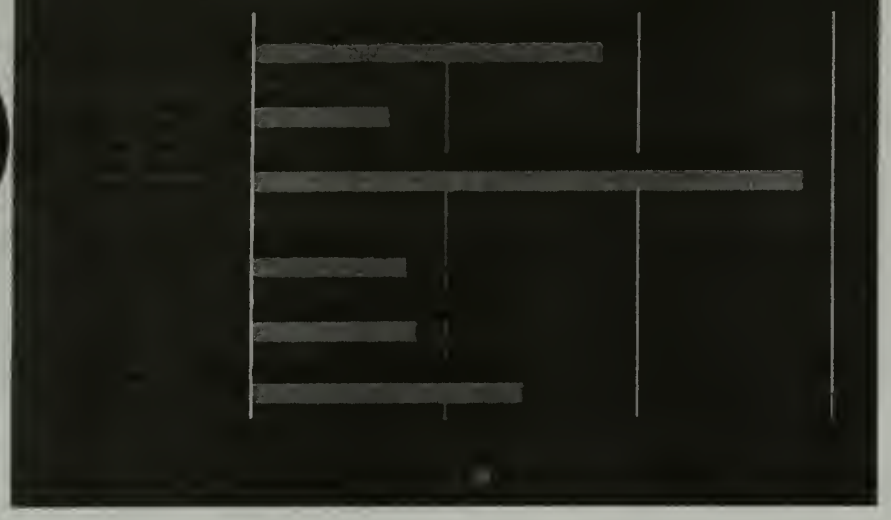


figure 5-11
Information Technology: Change in Employment, Greater Boston Region: 1993 to 2000

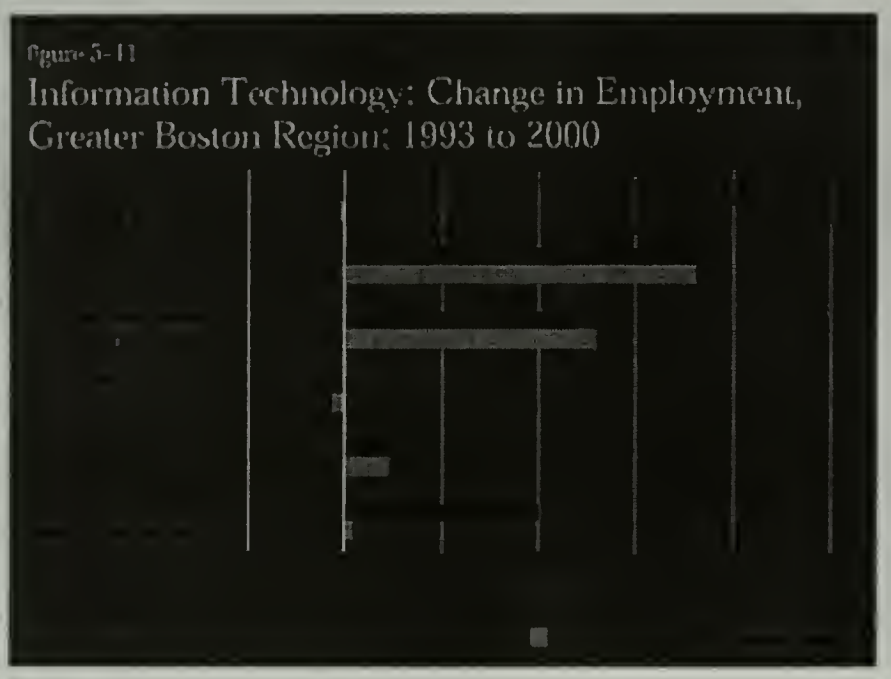
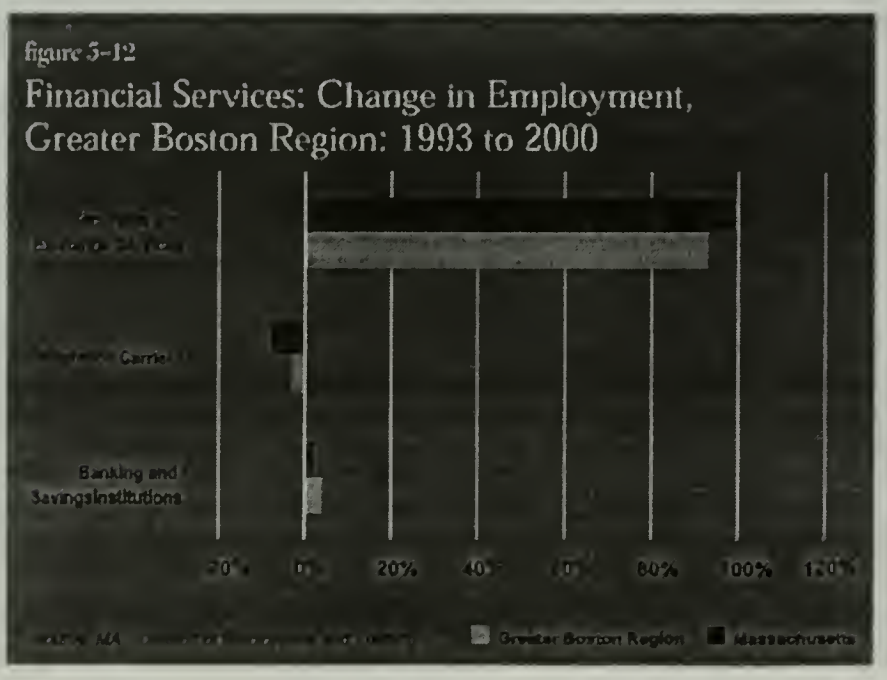


figure 5-12
Financial Services: Change in Employment, Greater Boston Region: 1993 to 2000



Knowledge Creation

Knowledge Creation experienced the most balanced growth of any of the export industry clusters. Research and testing, engineering and architectural services, and the management, public relations, advertising, and accounting industries all registered substantial employment gains. In Greater Boston, most of the Knowledge Creation clusters grew at close to their statewide averages and outpaced employment growth as a whole (a 28 percent gain as compared to 21 percent). The gains were led by the management, public relations, advertising and accounting services sector (see figure 5-10). The rapid increase in demand for these professional business services was likely driven by other rapidly growing export industries, which were fueled by record venture capital investments. Graduates of Greater Boston's many quality institutions of higher education helped these firms sustain this level of rapid employment growth.

Information Technology

Regional employment in the Information Technology export cluster grew far faster than overall employment in Greater Boston (60 percent versus 21 percent). The gains were greatest in computer software development and "other computer services," which grew 129 and 199 percent respectively. These two sectors created over 50,000 jobs between 1993 and 2000 jobs that paid an average of $100,750 in 2000. This was more than twice the regional and State average wage (see figure 5-11).

The Knowledge Creation and Information Technology export clusters account for nearly one quarter of the jobs in the Region, with almost 14 percent in Knowledge Creation and 9 percent in Information Technology. Even with these employment gains, growth in statewide employment was *at least* as high or higher. Employment growth in both groups, particularly Information Technology, was also very strong in the I-495 West sub-region. Knowledge Creation (7.9 percent of I-495 West employment in 2000) grew much faster than its State or regional counterparts, with employment rising over 75 percent, and the number of jobs in Information Technology (18.4 percent of I-495 West employment in 2000) rose almost 40 percent (see figure 5-8, on previous page). The growth of these clusters in the I-495 West sub-region was supported by the availability of land for development, immediate access to major roads, ready access to professional services firms, and to the cultural amenities their employees desired. By the end of the decade, however, a good deal of the land available for development had already been put to use.

Financial Services

Employment in the Financial Services export cluster (7.2 percent of Greater Boston's employment) grew 25 percent between 1993 and 2000, exceeding the statewide average for this cluster and slightly

exceeding overall regional employment growth. The securities and exchange services sector grew dramatically, rising over 90 percent and creating nearly 25,000 new jobs (see figure 5-12). In 2000, the average wage in the industry exceeded $160,000. This extraordinary growth was fueled by the rapid rise of the stock market during the 1990s.

Financial services employment in the I-495 West sub-region declined slightly overall, in sharp contrast to the Region and State (see figure 5-8, on page 56). While jobs in the regionally lucrative securities and exchange services sector increased dramatically, wages paid in the sub-region declined substantially between 1993 and 2000 – from $62,376 to $35,924. The most highly compensated jobs in this industry are concentrated in the City of Boston and its immediate suburbs. Relatively lower paying "back-office" jobs are located in the outer suburbs.

Health Care

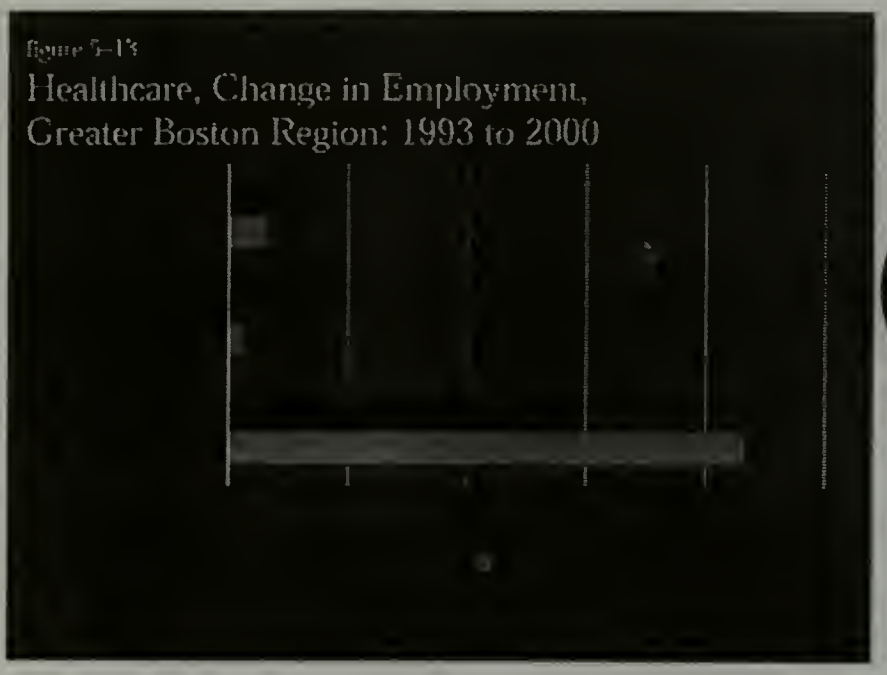
Employment in the Health Care export cluster (10.6 percent of Greater Boston's total employment) grew 7.0 percent during the expansion between 1993 and 2000, lagging the statewide average for the cluster and overall employment growth in the Region. While the drugs and pharmaceuticals sector grew 173 percent, it still represents less than 3 percent of total cluster employment in 2000. Employment in health services accounts for the lion's share of employment – nearly 170,000 jobs – and this industry grew modestly, rising 5 percent (see figure 5-13). Not surprisingly, jobs in the drugs and pharmaceuticals sector pay handsomely, averaging over $127,000 in 2000, while health services jobs, largely held by employees of hospitals, nursing homes, and other medical facilities, pay much lower wages, averaging only $44,020 in 2000.

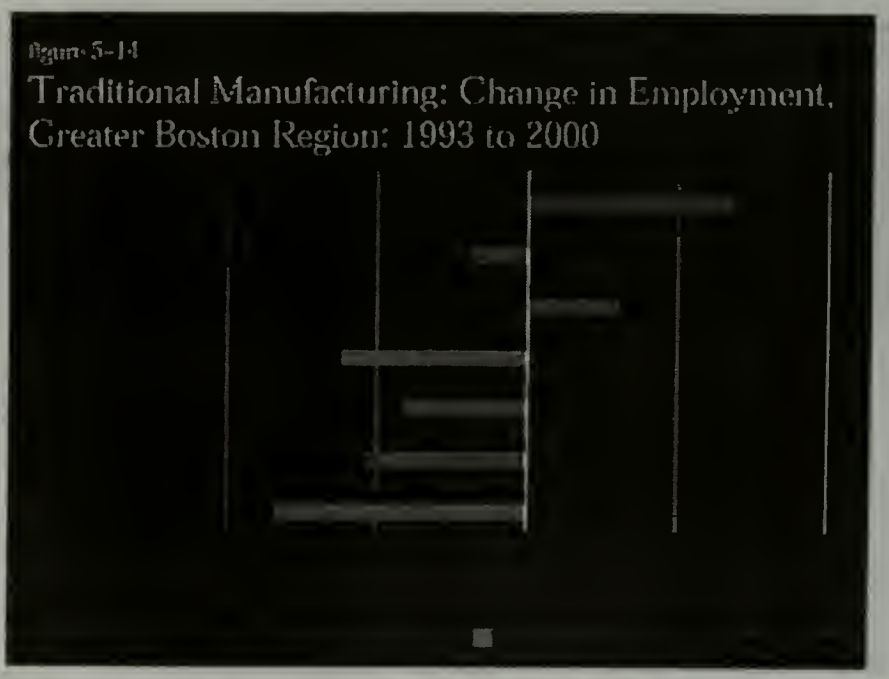
Traditional Manufacturing

Employment in the Traditional Manufacturing export cluster, now 3.0 percent of Greater Boston's employment, declined 15.9 percent between 1993 and 2000. The job loss was far greater than the 2.7 percent decline for the cluster statewide and in stark contrast to the 21 percent overall employment growth in the Greater Boston Region.

In percentage terms, employment growth in the plastics and rubber manufacturing industry far exceeded the statewide gains (34 percent compared to the 5 percent growth statewide). In absolute terms, employment growth was far more modest as the industry added less than 800 jobs between 1993 and 2000 (see figure 5-14). These gains were more than offset by employment declines in metalworking, paper, non-electric machinery, instruments, and apparel and textiles. This same pattern was also in evidence in the I-495 sub-region.

[7] Estimate based on FY 2000 State room occupancy tax collections, which are levied at 5.7% of the room rate.





Travel & Tourism

The growing impact of the Travel and Tourism cluster in Greater Boston can be seen in the experience of its hotel industry. In the year ending June 2000, hotels and motels in Suffolk, Middlesex, and Norfolk Counties grossed an estimated $1.3 billion in room sales, up 42 percent over the year ending June 1997.[7] These expenditures define a conservative estimate of traveler spending. This is because total spending typically includes meals, retail purchases, and attractions, in addition to spending on accommodations.

Room sales in Greater Boston exceeded the statewide gains of 37 percent, and propelled an expansion of the industry. Between 1997 and 2000, the number of hotels in Suffolk, Middlesex, and Norfolk counties increased 15 percent, to 221, and employment grew 11 percent, to 19,617 workers. The industry pays low wages and has a large number of part-time jobs, yet average real wages increased 6 percent in this period, to $27,962.

Figure 5-15
Demographic Summary Greater Boston Region

Figure 5-16
Greater Boston Region: Housing Supply

figure 5-17
Greater Boston Region: Home Ownership

Demographics

Population

Greater Boston is by far the most populous of the State's regions, and its 3,015,981 residents account for almost half of the Commonwealth's population. It lagged the State in population growth over the past decade, rising 4.9 percent vs. 5.5 percent for the Commonwealth (see figure 5-15). Changes have also been quite uneven across the Region, with the population of some cities and towns remaining stagnant or declining, while others have seen tremendous growth.

Most areas close to Boston have experienced very little population change. One exception was Chelsea, which increased by 22 percent. Otherwise, the highest growth in the Region has been along the I-495 corridor, particularly in the north (Wilmington, 21 percent), the west (Boxborough, 45 percent), and the southwest (Hopkinton, 45 percent; Southborough, 33 percent; and Franklin, 34 percent). Overall, the I-495 West sub-region experienced an 11.3 percent increase in population, growing at over twice the rate of Greater Boston.

Resident Age Distribution

Over the past decade, the median age in Greater Boston rose from 34 to 36.3, slightly below the State median of 36.6. This small increase masks a significant shift in the Region's age profile. The population of those aged 45 to 64 increased almost 22 percent to 666,805, while the 19 to 24 year-old age group fell by almost 19 percent, to 291,454 (see figure 5-15).

While both the State and Region experienced a mini "baby boom," this has not been enough to counter the aging of the population, which is likely to have significant effects on the economy.[8] An aging population means an aging workforce. Employers will find that the drop in the number of young workers entering the workforce will require them to adjust their hiring practices to fit an older, more experienced, entry-level worker. Displaced workers (which have increased substantially with the current recession) are going to be older, and many will be crossing industry sectors, thus requiring considerable retraining.

Two cities in Greater Boston – Boston and Chelsea – have become "minority majority" communities, as non-Hispanic Whites account for less than 50 percent of their populations.[9] In twelve towns close to Boston, over 20 percent of the population is classified as "minority."[10] The Region is home to 194,051 Hispanic residents -- almost half the State's Latino community.

Housing

Greater Boston's housing stock reflects its largely urban character, as well as its high population density. The percentage of owner-occupied housing is close to that across the Commonwealth.

However, the percentage of renter-occupied units is the highest of the seven Massachusetts Regions. Most of the rental housing is concentrated within the I-93/Route 128 belt. As evidence of this, owner-occupied housing accounts for 71 percent of all units in the I-495 West sub-region, considerably higher than the Region as a whole (see figures 5-16 and 5-17).

More important to the local economy than the mix of the housing stock is its cost. Average home prices in the Greater Boston Region are now over one-third higher than the average for the State. Further, home prices have increased at accelerating rates through the 1990s.

An important reason for Greater Boston's population expansion being concentrated in the I-495 belt is this sub-region's relatively low housing costs. Prices average about 10 percent below those of the Region as a whole, and they increased less quickly through the late 1990s.

Regional Strengths and Competitive Advantages

Greater Boston is an attractive place for businesses to locate and grow because it is uniquely blessed with the following strengths:

Educated workforce. In 1990, one-third of all residents aged 25 and older had completed four or more years of college, compared to one-in-five elsewhere in the Commonwealth. Whereas 83 percent in Greater Boston had graduated from high school, elsewhere in the State the figure was only 80 percent.

Colleges and Universities. The presence of world-class institutions of higher education has helped the development of the information technology and biotechnology industries, as well as anchoring the Knowledge Creation cluster. These institutions also provide support to the Region's teaching hospitals, which contribute to the area's unusually high concentration of medical facilities.

Transportation infrastructure. Public transportation is a major strength for parts of the Region, particularly the areas in and around Boston. The presence of the major highways of I-495 and I-93/I-95 has contributed immensely to the development of the entire Region. An international airport and major seaport are great assets. Though the seaport has been losing commercial business to other major east coast ports, it has expanded its servicing of major cruise lines, which has helped the growth of the Travel and Tourism cluster.

Natural resources/environment. Parts of Greater Boston are blessed with ample drinking water from the Quabbin Reservoir. The upgrading of the MWRA sewage disposal system has contributed to a substantial improvement in the environmental quality of Massachusetts Bay. The Region has other initiatives that show a serious commitment to environmental quality, including watershed initiatives, community preservation programs, and brownfields programs.

Challenges to Future Growth

Congestion. Boston and its immediate vicinity remain hampered by the incomplete Central Artery Project. However, when completed, it should considerably improve road transportation in and out of the city. The interstate highways have played a major role in expanding commercial development. However, these highways have also led to congestion in the Region's more rural areas. The public transportation system is particularly weak in the I-495 area, putting additional pressure on narrow secondary roads.

Airport limitations. Logan Airport is reaching its limits in being able to handle the passenger and commercial traffic brought about by the Region's rapid growth during the 1990s. Although passenger traffic has declined with the recession and the tragedy of September 11th, this reduction is likely to be temporary. Future growth may be hampered without further expansion of satellite airports, such as Worcester and Hanscom, or the expansion of Logan itself.

High cost of living. The Region has always been at a competitive disadvantage because of its high cost of living, due particularly to high energy and housing costs. This has become much worse with the recent rise in housing prices. Issues of affordable housing remain significant in all communities. House purchases, for many middle class families, are becoming increasingly difficult. Firms in the area are finding that high home costs are complicating efforts to recruit new workers, while the high cost of living makes it difficult to retain graduates from its many colleges and universities.

Lack of regional cooperation. There is limited cooperation among neighboring communities in terms of planning for development and managing public services. Because the area is comprised of so many small communities, the failure to work together often leads to duplication of services or to developments in one community that negatively impact other communities.

---

[8] Peter B. Doeringer, Andrew Sum, and David Terkla, "Older Workers: An Essential Resource for Massachusetts," Commonwealth of Massachusetts Blue Ribbon Commission on Older Workers, April 2000.

[9] MAPC Comprehensive Economic Development Strategy (CEDS), December 2001.

[10] Data describing change in race and ethnicity must be used with caution. For more information, see the Part II Introduction.

Limited water supplies. Water availability is a serious concern for communities not served by the Quabbin Reservoir. Some commonly ration water during the summer and a lack of sufficient water hampers their economic development.

Inefficient land use. While there have been efforts to encourage development on brownfield sites in urban areas, many remain underutilized.

Labor shortages. The Region has been experiencing substantial labor shortages. Though these have eased with the recession, the long-term outlook is for shortages to worsen and hold back economic development. There are also substantial skill mismatches between the capabilities of workers who are being laid off by declining sectors and the needs of firms in expanding sectors. Contributing to this shortage of skilled workers are the continued challenges faced by our public school systems, particularly in urban areas.

Lack of access to suburban jobs. Greater Boston's urban areas became more racially and economically diverse in the 1990s. Yet, the same diversity has not reached many suburban areas. This is due, in part, to the high cost of housing in many suburban communities in the Region. Given the rapid employment growth in the I-495 sub-region, Greater Boston needs a strategy to help connect urban residents to suburban job opportunities.

Regional Policy Priorities

Workforce development

Expanding the skills and size of the workforce is a top priority for the Region. This reinforces the need for a comprehensive planning system for all publicly funded workforce development programs in the Commonwealth.

In April 2000, a Blue Ribbon Commission on Older Workers, established by then-Governor Cellucci, highlighted the importance of better integrating older workers into the workforce. This group of workers was shown to be the only sizable source of readily available labor in the near future and the pool of workers most likely to have the major skills needed by the New Economy. The Commission also recommended establishing an independent system for evaluating all workforce development programs in terms of long-term improvements in participant earnings and in reductions in skilled-labor shortages.

Basic skills and language training

The Region is increasingly dependent on foreign immigrants to meet its workforce needs. Many of these immigrants need English language and basic skills development programs, which are currently in short supply. As a result, there are long waiting lists for access to many of these programs.

Affordable housing

There is a need to expand the stock of affordable housing in Greater Boston's communities. The Region needs an approach to housing issues that encourages the maintenance of good housing stock in urban areas and the efficient reuse of abandoned mill space and upper stories of street level businesses. It also needs to plan for housing in areas with rapidly expanding office parks. Innovative office park development, such as higher density, mixed commercial businesses and housing, should be encouraged.

Regional planning

This leads to a larger need for communities in the Greater Boston area to pursue more comprehensive regional planning. Executive Order 418, the Executive Office of Environmental Affairs (EOEA) program to provide all communities with build-out analyses,[11] has proven valuable. However, planning efforts are still not adequately regionalized. The I-495 Technology Corridor Initiative offers a useful model for other Greater Boston sub-regions. Consideration should be given to granting Greater Boston's regional planners powers similar to that of the Cape Cod Commission.

Transportation infrastructure

The Region needs transportation solutions that link the poorer towns bordering the city to centers of activity that can enhance their development prospects. It also needs improved public transportation for the I-495 sub-region to alleviate the congestion caused by the current expansion. If not addressed, that congestion will eventually discourage businesses from expanding and limit the attractiveness of the area for current and future residents.

Improved water supplies

The Region needs to undertake serious regional water resource planning, particularly to address the needs of communities not linked to the Quabbin Reservoir.

Linking the Region's Policy Priorities to Potential Solutions

Part III provides a variety of policy options that can help address the Region's economic development priorities: Figure 5-18 shows where to find relevant options.

[11] A build-out analysis identifies land in a community where zoning laws allow for development. Such analyses typically project demographic and fiscal impacts resulting from development of this land.

Figure 5-18

Policy Options for Regional Priorities Greater Boston Region

northeast region



The Northeast Region borders New Hampshire to the north and the Atlantic Ocean to the east as far south as Rowley and extends along the I-495 corridor from Westford through Lowell and Lawrence to Salisbury. It includes large parts of Essex and Middlesex counties and twenty-three cities and towns ranging from the old mill cities of Lowell, Lawrence, and Haverhill to towns that have recently witnessed explosive growth, such as Andover, Chelmsford, and Westford.

Mills along the Merrimack River once fueled the nation's Industrial Revolution, and they fueled the economy of the Northeast Region into the post-World War II era. Since 1950, however, three trends have dominated the regional economy: 1) the sharp decline of the textile industry; 2) the Cold War buildup and post-Cold War reduction of defense spending; 3) and the meteoric emergence and eventual flame-out of the minicomputer industry.

The legacy of its roller coaster economic history is a rich concentration of innovative national and international high-tech firms, many of them supported by an array of locally-owned companies, and a host of agencies and organizations concerned with issues such as job training, immigrant business assistance, and affordable housing that are key to the Region's sustained development. It has remained the State's high-tech manufacturing growth engine and a powerful stimulus for the Commonwealth's spectacular economic growth in the 1990s.

In addition to its strength in high-tech manufacturing, several cities and towns promote tourism linked to agriculture, the sea, or the nation's industrial heritage; parts of the Region are rural and relatively uncongested. Whale watches, cultural festivals, golf, beaches, coastal and mountain hiking, and professional baseball and hockey contribute to the Northeast's lifeblood.

Passenger rail connections run from Lowell to Boston, linking several cities along the North Shore, and rail service has recently expanded to include stops in New Hampshire and Maine. The Region is proximate to several airports, including Logan International, Hanscom Field, the Worcester regional airport, and Manchester, New Hampshire. Rapid industrial, commercial, and

figure 6-1
Northeast Region Labor Force and Employment

residential growth along its interstate and State highways, fueled by the late 1990s surge in high-tech manufacturing and software services, has generated significant automobile congestion and placed great stress on the Region's infrastructure.

Economic Overview

Employment[1]

The Northeast Region responded well to the opportunities of the 1990s and performed significantly better than the Commonwealth as a whole. Spurred by vigorous growth in software, telecommunications, and related business services, employment grew 16 percent from 1990 to 2001 (versus 12.4 percent in the State), the workforce expanded 12.6 percent (versus 6 percent)(see figure 6-1), and the population 8.6 percent (versus 5.5 percent). Job creation exceeded workforce gains, especially from 1993 to 1996, causing unemployment to fall sharply (see figure 6-2). Until the downturn at the end of 2000, firms struggled to find engineers and other highly skilled workers to support this growth.

figure 6-2
Northeast Region Unemployment Rate

Employment by Major Industry Sector

What does the Region's industrial structure look like and how does it compare to that in 1993? In broad brushstrokes, there was a shift from manufacturing to services during the expansion that ran from 1993 until 2000. Although manufacturing employment[2] grew, the sector's share of employment slipped from 25.0 to 20.8 percent. Services gained a bit more than manufacturing lost, rising from 33.2 to 37.9 percent of employment in the Region (see figure 6-3).

figure 6-3
Northeast Region Employment by Major Industry

There was no change in the industries that were the Region's top five employers from 1993 to 2000, although rankings shifted a bit (see figure 6-4).

When using annual payroll to identify the Region's top five industries, educational services and eating and drinking places fall off the list and are replaced by wholesale trade/durable goods and industrial and commercial machinery and computer equipment (see figure 6-5 on next page).

figure 6-4
Northeast Region Top 5 Industries by Employment

[1] The data in this section on the number of people employed, in the labor force, and unemployed are taken from the household survey. They therefore will not match the employer-based data used in other sections that report the number of payroll jobs.
[2] Employment is measured here using the Bureau of Labor Statistics, ES-202 series, which are employer reports of payroll jobs rather than household-based measures of employed or unemployed people. As a result, the numbers will differ from employment figures based on the household survey presented in other sections of the document.

figure 6-5
Northeast Region Top 5 Industries by Total Annual Payroll

figure 6-6
Change in Employment, by Major Industry, Northeast Region: 1993 to 2000



figure 6-7
Northeast Region Average Real Wages

The Critical Importance of Manufacturing

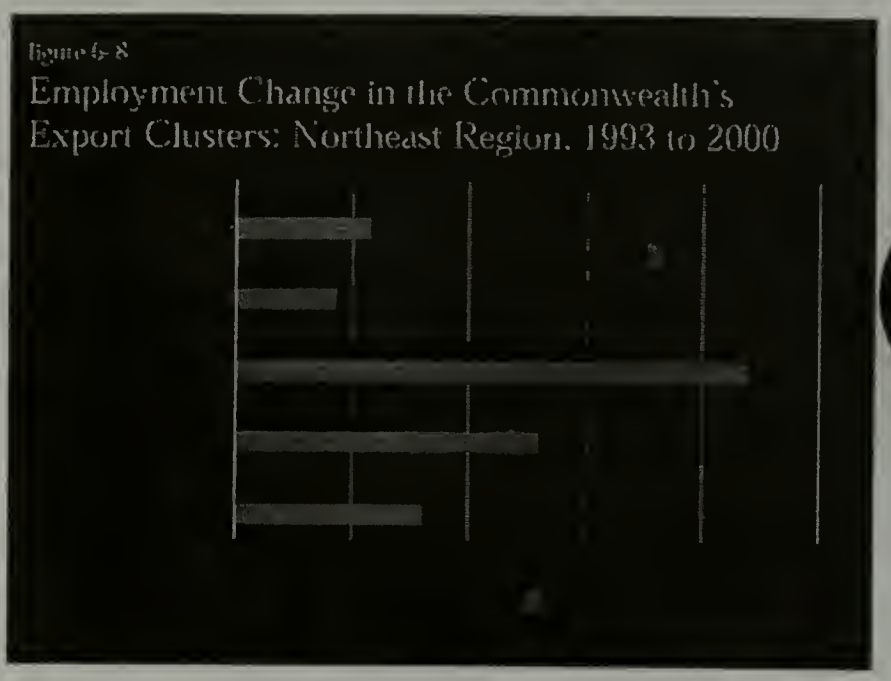
The Commonwealth may lay legitimate claim to being the birthplace of American Industry, with the Northeast Region at its core. While the importance of manufacturing has declined in the Commonwealth as in the nation, it remains critical to the Region's economic well-being. Manufacturing establishments provide 20.8 percent of employment in the Northeast Region, well above the State figure of 13.4 percent. Pay in high-tech manufacturing establishments often far exceeds the State's average. Computer and related hardware manufacturing pays in excess of 185 percent of the State's average wage, industrial machinery manufacturing pays 174 percent, instruments 164 percent, and electronic equipment 151 percent. Because of these relatively high wages, manufacturing in the Northeast Region generates 29.5 percent of total payroll, compared to 16.7 percent statewide. Largely on the strength of its high-tech manufacturing sector, real average wages in the Region have tracked higher than the State average since 1995, widening the gap dramatically since 1998.[3]

Twenty-first century goods producers place great emphasis on capital-intensive activities and their investments often result in purchases from firms in the Region and the State. Goods producers also rely more and more on research into such things as new materials, the life sciences, opto-electronics, and wireless communications. Much of this research is conducted at colleges and universities and in private laboratories in the Northeast and Greater Boston Regions. Manufacturers apply state-of-the-art technologies to boost the output of their employees. Finally, they contract for many business services, such as payroll preparation, benefits calculation, marketing research, and specialized production that expand the regional economy. Manufacturing's significance thus spreads well beyond the employment figures and its importance cannot be underestimated (see figure 6-6 and 6-7).

The Northeast Region Export Sector

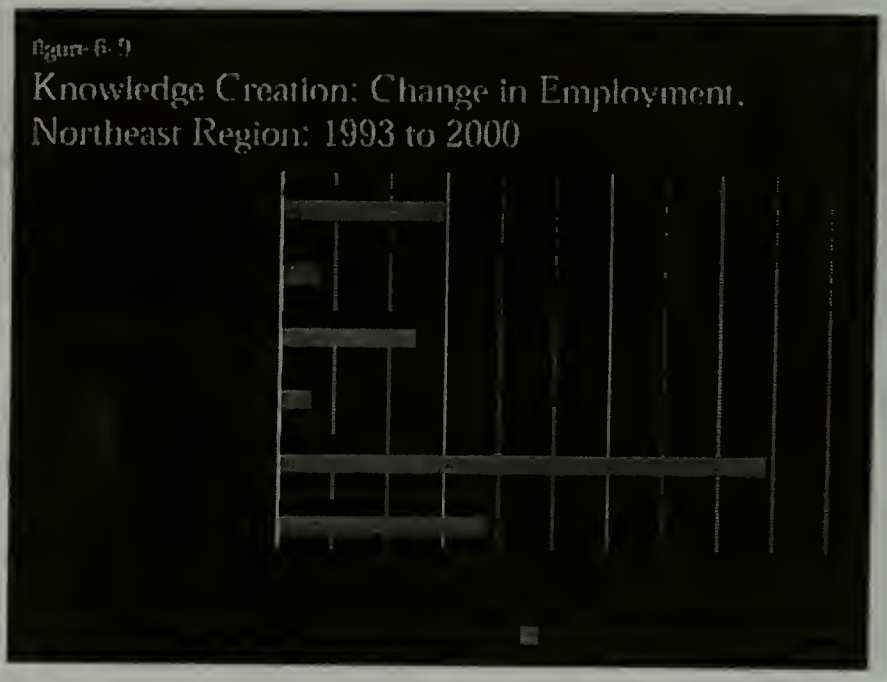
As explained in Chapter 2, a healthy Export Sector is critical to a Region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's Export Sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[4] and the more recent *Knowledge Sector Powerhouse*.[5] They include four knowledge-based Clusters - Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive; Travel and Tourism and, "Traditional Manufacturing" (manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery, that are not part of the Information Technology or Health Care clusters). The discussion below uses this framework to explore the Northeast Region's export sector.

Figure 6-8 shows export cluster growth in the region as compared to Massachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The Health Care Cluster, for example, includes physicians serving the local population. A finer picture of the composition of the Region's export sector, and the extent to which it has become part of the wider Knowledge-based Economy, is developed in the discussions that follow. Also, note that some of the following charts show no data for some industries in the export clusters. This does not necessarily mean that the industry is absent. Federal rules prohibit access to data that could provide information about individual firms. The lack of industry data could be due to this limitation.



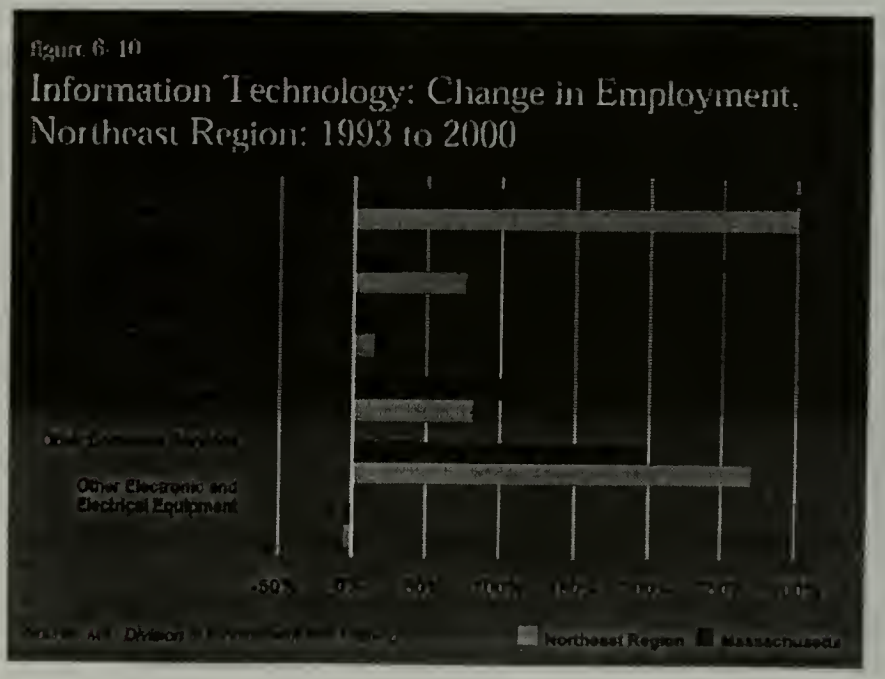
Knowledge Creation

Growth in employment in the Knowledge Creation export cluster generally mirrored that of the State. The higher education sector, grew substantially in both absolute and percentage terms. Employment in this sector grew from 1,927 in 1993 to 5,338 in 2000. Significant growth was also experienced by the engineering and architectural services sector. Firms in this sector had employment growth of 76% (+1,082 jobs) during this same period (see figure 6-9). A growing demand for highly-skilled "knowledge workers" by the Region's high-tech employers may be partly responsible for higher education growth.



Information Technology

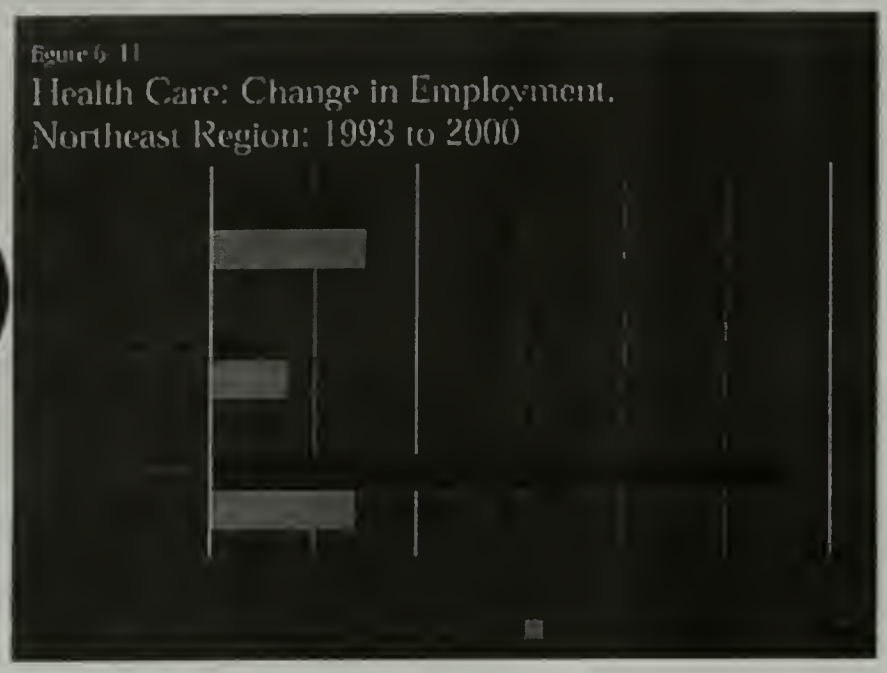
Both the hardware and software sectors expanded rapidly, adding jobs between 1993 and 2000. The surge in communications hardware manufacturing, which emerged to build-out of the worldwide Internet, wireless, and networking revolution, was nothing short of astounding. Only that performance could take the luster away from the impressive growth of Region's computer and communications software and services industries which added nearly 7,500 jobs between 1993 and 2000. Computer, electronic, and electrical equipment manufacturing did not see much employment growth over the 1990s (see figure 6-10). Nevertheless, electronic and electrical equipment and the large SIC "industrial machinery" category, which includes computers and related hardware, ranked first and second in the State for total dollar value of exports throughout much of the 1990s.

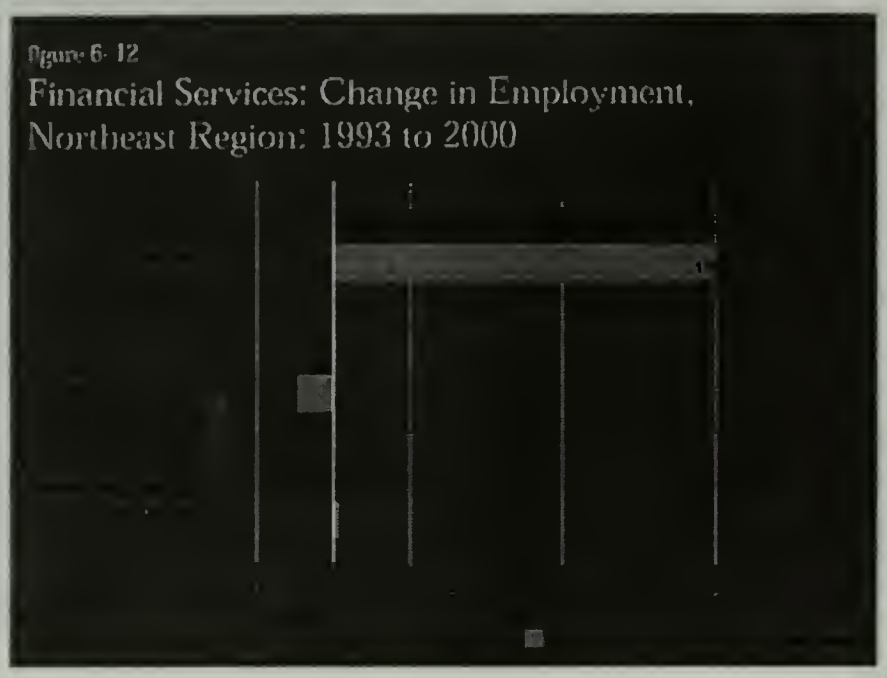


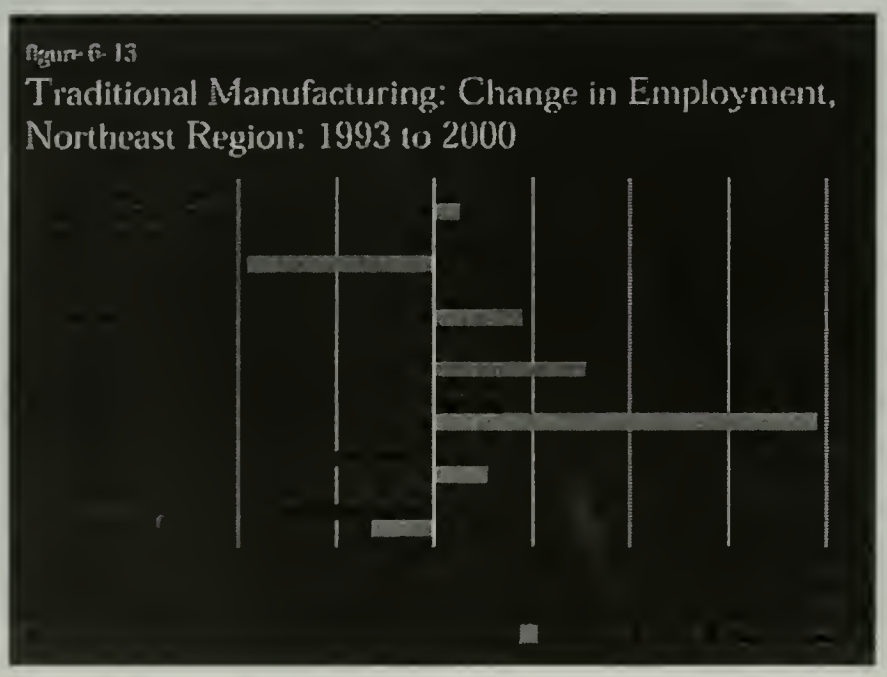
[3] The U.S. consumer price index (CPI) was used to adjust nominal wages for the effects of inflation.

[4] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts, (Boston, 1993).

[5] Robert Forrant, Philip Moss, and Chris Tilly, (Boston: UMass Donahue Institute, 2001).







Health Care

Employment in the Region's large Health Care Cluster was led by health services, which added over 5,000 jobs between 1993 and 2000, and expanded at a rate exceeding that of the State (15% in the Region, 8% versus for the State as a whole). Regional employment in the dynamic medical instruments manufacturing sector expanded at the same rate as the State as a whole. While the drugs and pharmaceuticals sector grew robustly - employment expanded 28% between 1993 and 2000, this sector grew much more slowly in the Northeast than it did statewide (see figure 6-11).

Financial Services

During the 1990s, the Northeast Region became increasingly attractive to financial services firms seeking locations for "back office" facilities. This can be seen in the tremendous growth in employment in the securities and exchange services sector which added over 2,200 jobs between 1993 and 2000. During this same period employment in the Insurance sector declined by 12 percent. Employment in the banking sector remained level. (see figure 6-12)

Traditional Manufacturing

Much of the Region's business activity is concentrated along the I-495 corridor at the intersections of I-495, I-93, and I-95. Many of the jobs are in three high-skill, high-wage, export-oriented industries: fabricated metal, industrial machinery (not including computer and related hardware), and instruments (see figure 6-13).

Travel and Tourism

The growing impact of the Travel and Tourism cluster in the Northeast Region can be clearly seen in the Region's hotel industry. In the year ending June 2000, hotels and motels in Essex County grossed an estimated $112 million in room sales, up 29 percent over the year ending June 1997.[6] These expenditures define a conservative estimate of traveler spending. This is because total spending typically includes meals, retail purchases, and attractions, in addition to spending on accommodations.

Room sales growth, which lagged behind the statewide growth rate of 37 percent, supported limited growth in the industry. Between 1997 and 2000, the number of hotels in Essex County remained constant, at eighty-two. Employment expanded 36 percent, to 2,716 workers. Pay in the industry is low, and frequently offers mostly part-time jobs. Yet average real wages increased 25 percent in this period, to $20,044.

Demographics

Population

A strong economy contributed to an 8.6 percent increase in the Region's population. This compares favorably to the 5.5 percent growth across the Commonwealth and resulted in a slight gain in the Region's share of the State population (see figure 6-14).

Resident Age Distribution

The Region's population is aging. In the decade of the 1990s, its median age increased by three full years, going from 32.3 to 35.3 years, compared to the Commonwealth's increase of 2.8 years, from 33.8 to 36.6. Residents aged 19 to 44 made up 45 percent of the regional population in 1990, but only 40 percent in 2000. This is a worrisome trend, for it implies the loss of a portion of the college-educated skill base. Nor can the Region expect much relief in the future: the 19-24 cohort fell more than 20 percent, from 58,733 to 46,845 (see figure 6-14).

Just as this skill base loss poses a significant challenge, so too does the growth of the under-18 population. Cities and towns are expected to educate this burgeoning group, a task made difficult by any protracted economic downturn or decline in tax revenues. The largest population gain came in the 45-64 cohort. As these older workers retire, they will join the under-18 cohort in requiring an array of public services, such as daycare and elderly housing. The fall-off of residents 19-24, as well as low growth among the 25 to 44 cohort portends labor shortages and a shrinking taxpayer base.

Resident Racial Distribution

The Region's population was almost 90 percent White in 1990, compared to 86 percent in 2000. Slightly more diverse than the State as a whole, the Northeast Region's non-white population resides mainly in Lowell and Lawrence. The Region also has the largest percentage of Hispanics anywhere in the Commonwealth other than the Pioneer Valley.[7]

[6] Estimate based on FY 2000 State room occupancy tax collections, which are levied at 5.7% of the room rate.

[7] Data describing change in race/ethnic mix must be used with caution. For more information, see the Part II Introduction

figure 6-14
Northeast Region Demographic Summary

figure 6-15
Northeast Region Housing Supply



figure 6-16
Northeast Region Home Ownership

Housing

The Region faces a serious housing problem that places a major roadblock in front of long-term community development. Housing prices have gone up faster than incomes and there is a shortage of rental units. A detailed study of the housing issue in the Merrimack Valley conducted by the University of Massachusetts Lowell's Center for Family, Work, and Community concluded that the Merrimack Valley has too few units and, the units that do exist are too expensive. The problem will only worsen over time, because new units are not being created quickly enough. In 2000, the region-wide vacancy rate for apartments was 2.6 percent; in June 2001, the rate in Lowell was one percent. It is estimated that the demand for rental housing in greater-Lowell will exceed the supply by over 2,000 units in 2004, with affordable units disappearing at an alarming rate. This represents a serious challenge, since approximately 34 percent of Northeast residents are renters (see figure 6-15 and 6-16 on previous page).

The Merrimack Valley Planning Commission linked two important issues - brownfields development and housing - in its May 2001 report entitled, "Economic Development Strategy for the Merrimack Valley." It suggested the residential reuses of older mill buildings "to provide housing for employees and to enliven the districts at night." Individual cities and towns cannot resolve the shortage by themselves. Community-based organizations, labor unions, local and regional community development corporations, immigrant organizations, and faith-based organizations must cooperate to resolve the housing crunch.

Regional Strengths and Competitive Advantages

Four keys to the Region's past success were: access to water power, skilled craft labor, transportation, and the latest in mill technology. The area continues to enjoy a strong skill base, though demographic trends and the fast pace of change in many jobs in the New Economy indicate that we should not take this strength for granted. Looking ahead, the Region's critical strengths are:

Skilled workforce. A concentration of excellent technical high schools and educational institutions provides a solid foundation for economic prosperity. Labor unions and faith-based organizations also contribute to workforce education and training to boost the skill base and keep the Region attractive for employers. These groups also help keep work in the Region, attract new investments, and encourage start-ups.

Immigrant contributions. Lowell alone has over 300 immigrant-owned businesses, representing people from at least 22 different countries. These entrepreneurs serve the consumer needs of their communities, add value to the broader service sector, and revitalize our neighborhoods. Immigrant workers are concentrated in skilled and semiskilled production across the Commonwealth's manufacturing industries, which provide "a major share of the State's exports to other states and to other countries."[8]

Culture of collaboration. A shared perspective on what it takes to create an equitable and sustainable economy is beginning to take shape. As the Northeast moves away from a reliance on a handful of dominant employers, these emerging networks may represent the best hope for the regional economy. Collaborative efforts can focus attention on important environmental concerns, establish broad-based coalitions to address the housing crisis, raise awareness of the important role that immigrants play in the social and economic life, and help launch and support new ventures that generate income for the Region.

Challenges to Future Growth

Many families did not benefit from the 1990s boom. Average family income for the bottom 40 percent of families has not grown since 1993, and both child poverty rates and the use of emergency housing and food services have increased.[9] Decreased access to affordable housing and the failure of the last business expansion to reach all sectors of the population, particularly in its older mill cities, means there is much work to do to safeguard and enhance the Region's strengths.

Affordable housing. For many workers employed in the service sector or in part-time jobs, wages have not kept pace with the purchase price of a home or rent on a three- or four-bedroom apartment. Nor has the construction of affordable rental units kept pace with demand. From 1996 to 2000, average home prices in the Northeast increased 51 percent to $194,372 from $128,389, compared to a State increase of 48 percent to $205,312 from $139,018.

Creating opportunities for low-skilled workers. As home to some of the State's poorest areas, there is concern about what will happen to students who may not pass the MCAS tests. The dropout rate in many of the Region's high schools is already extremely high, and every effort must be made to see that educational reform enhances, rather than diminishes, the prospects of our young people. There is also concern about what single mothers, particularly those that have used up their years of welfare eligibility, will do in a regional economy that offers few jobs to those with limited skills.

Brownfields. Much of the Region's recent growth proceeded on so-called greenfield sites. For many communities, however, such buildable space is just about gone. Old industrial and commercial buildings at the center of our largest cities and towns are typically

viewed as liabilities rather than assets. Overcoming this perception, reusing older buildings, and revitalizing our urban spaces will be critical if the Region is to have adequate developable land to support its future growth.

Transition in Community Leadership. The Region's large employers have traditionally guided its educational, economic, and civic resources. As these companies break up and disappear, this leadership vacuum needs to be filled. Community-based organizations, start-up businesses, grassroots coalitions, broad-based development agencies, labor unions, and higher education play increasingly important roles in addressing issues bearing on the Region's long-term development.

The recent drop-off in manufacturing. There have been massive layoffs in the information technology and high-tech manufacturing sectors since mid-2000, and hiring has virtually stopped for a host of high-paying jobs. This could have a serious ripple effect across the Region. A loss of thousands of good jobs will affect the housing market. Hundreds of relatively new retail and service companies, such as day care, lawn care, restaurants, take-out food, upscale car dealerships, Web design firms, home remodeling, will also face challenges when their customer's disposable income dissolves.

Regional Policy Priorities

The Northeast has an impressive concentration of innovative high-tech firms. They are supported by a diverse subset of locally-owned companies and a host of agencies and organizations concerned with issues such as job training, immigrant business assistance, and affordable housing. It also has public and private higher education institutions- including the University of Massachusetts Lowell, Northern Essex Community College, Middlesex Community College, and Merrimack College- that are deeply committed to the social and economic development of northeastern Massachusetts. This community, however, has a few clear issues to address:

Better training for low-skilled workers. There is also a need for improved coordination and service delivery of Adult Basic Education and English classes for speakers of other languages. Such programs are especially important to the cities that have experienced an influx of non-English speaking immigrants.

Redevelopment of brownfields. Progress has been made in several cities, most notably in Lowell. Andover, Haverhill, Lawrence, Lowell, Newburyport, and other cities have also turned abandoned mill sites and defunct malls into attractive space for high-tech manufacturing start-ups, software companies, design studios, university laboratories and offices, restaurants, and retail uses. Nevertheless, a regional strategy to reclaim old mill space is essential if the older cities are to flourish.

Diversifying the Region's economic base. Reliance on a relatively small number of major employers has made the Region vulnerable to economic downturns. The latest recession hit the area hard and resulted in a significant loss of jobs in high-tech manufacturing. A sustained and coordinated effort will be needed to ensure that the Region is better prepared to weather future economic downturns.

Linking the Region's Policy Priorities to Potential Solutions

Part III provides a variety of policy options that can help address the Region's economic development priorities. Figure 6-17 shows where to find relevant options.

figure 6-17
Northeast Region Policy Options for Regional Priorities

[8] W. Neil Fogg, Neeta Fogg, and Andrew Sum, The Changing Workforce: Immigrants and the New Economy in Massachusetts, Boston, The Massachusetts Institute for a New Commonwealth, 1999. Lawrence has the highest percentage of Hispanic residents in Massachusetts (60%), and Lowell the highest percentage of Asian residents (17%) (Merrimack Valley Economic Development Council, U.S. Census reveals growth, and change as the Merrimack Valley heads into a new century, Report, 2, May-June, 2001.) For an analysis of immigrant-owned enterprises in Lowell, see Linda Silka and Robert Forrant, "Moving Toward Equity and Economic Empowerment: Some Observations on Immigrant and Ethnic Enterprises in Lowell, Massachusetts," University of Massachusetts Lowell Department of Regional Economic and Social Development, unpublished paper, March 1999.

[9] Randy Albelda, Donna Haig Friedman, Elaine Werby, "Still Struggling to Survive," Boston Globe, July 6, 2001, A23; Kimberly Blanton, "In N.E., Boom and Less Thunder," Boston Globe, June 19, 2001, D1.

Figure 7-5
Change in Employment, by Major Industry, Southeast Region: 1993 to 2000

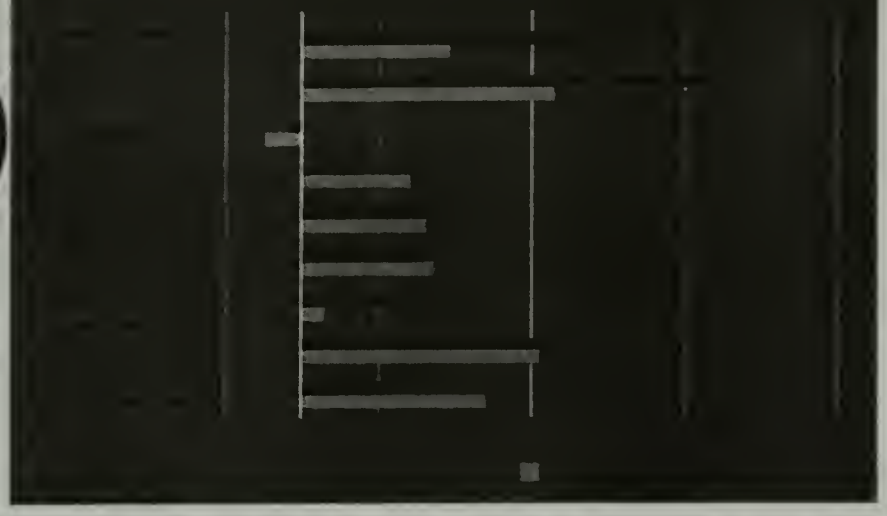
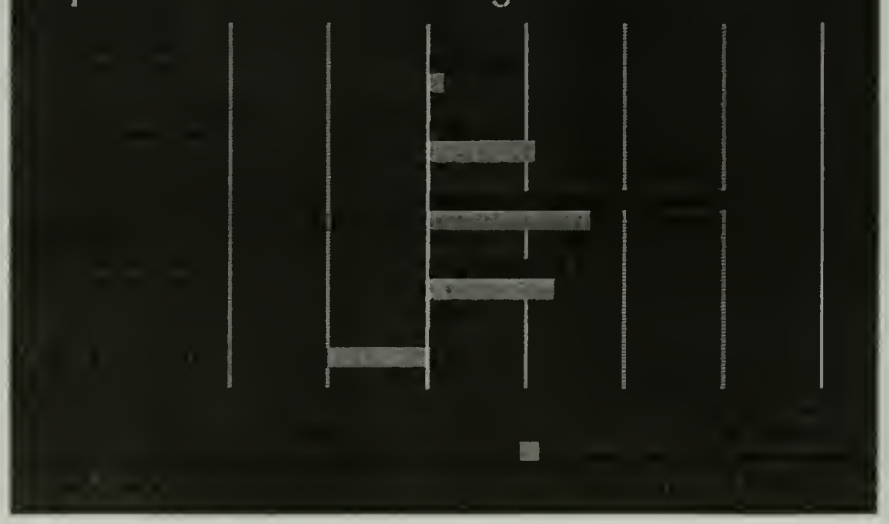


Figure 7-6
Change in Real Average Pay, by Major Industry Southeast Region: 1993 to 2000



Figure 7-7
Employment Change in the Commonwealth's Export Clusters: Southeast Region, 1993 to 2000



The Southeast Region Export Sector

As explained in Chapter 2, a healthy export sector is critical to a region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's export sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[6] and the more recent *Knowledge Sector Powerhouse.*[7] They include four knowledge-based clusters: Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive: Travel and Tourism, and "Traditional Manufacturing" (manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery, which are not part of the Information Technology or Health Care clusters). The discussion below uses this framework to explore the Southeast Region's export sector.

Figure 7-7 shows export cluster growth in the Region, as compared to Massachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The Health Care cluster, for example, includes physicians serving the local population. A finer picture of the composition of the Region's export sector, and the extent to which the Region has become part of the wider knowledge-based economy, is developed in the discussions that follow.

In the clusters making up the Commonwealth's Export Sector, employment in Southeastern Massachusetts is concentrated in Health Care, Information Technology, and Knowledge Creation.

In Health Care, three out of four jobs are in hospitals, doctor's offices, and other medical facilities. Given the changing demographics in Southeastern Massachusetts, the growth in health services employment may be due to increasing demand for these services by an aging population.

IT employment growth was concentrated in communication services, which added 1,556 jobs between 1993 and 2000. This industry also experienced a substantial gain in pay, with average real wages rising 75 percent.

Knowledge Creation growth was driven by a 52 percent increase in employment in Professional Services (including accounting but not legal) and a 49 percent gain in Higher Education.

Trends in the hotel industry show the growing impact of the Travel and Tourism cluster in the Region. In the year ending June 2000, hotels and motels in Plymouth and Bristol counties grossed an estimated $67.5 million in room sales, up 30 percent over the year ending June 1997.[8] These expenditures provide a conservative estimate of traveler spending. This is because total spending typically includes meals, retail purchases, and attractions, in addition to spending on accommodations.

Room sales growth, which lagged behind the statewide growth rate of 37 percent, supported limited growth in the industry. Between 1997 and 2000, the number of hotels in Bristol and Plymouth counties fell from 69 to 66 percent. Employment expanded eight percent, to 1,612 workers. Pay in the industry is low and frequently offers mostly part-time jobs. Yet average real wages increased 16 percent in this period, to $14,700.

Critical Industries of the Southeast Region

In addition to analyzing the export base of Southeast Massachusetts, it is also useful to examine the critical industries of the region. The Region's Top Five Industries are heath services, professional services, business services, high technology, and distribution. These industries provide 39.5 percent (138,348) of total employment (350,249), and they include many sectors that were among the Region's fastest growing employers from 1993 to 2000 (see figure 7-8).

The Sub-Regions of Southeastern Massachusetts

The South Shore Area

The South Shore area consists of 12 towns in Plymouth County, five of which are located in the "Southeast Region" proper. It is the smallest sub-region, yet the fastest growing, with 197,074 residents in the 2000 Census, 11.0 percent more than in 1990. There are no cities in the South Shore. But the area's two largest towns, Plymouth (51,701) and Marshfield (24,324), account for 38.6 percent of the area's population.

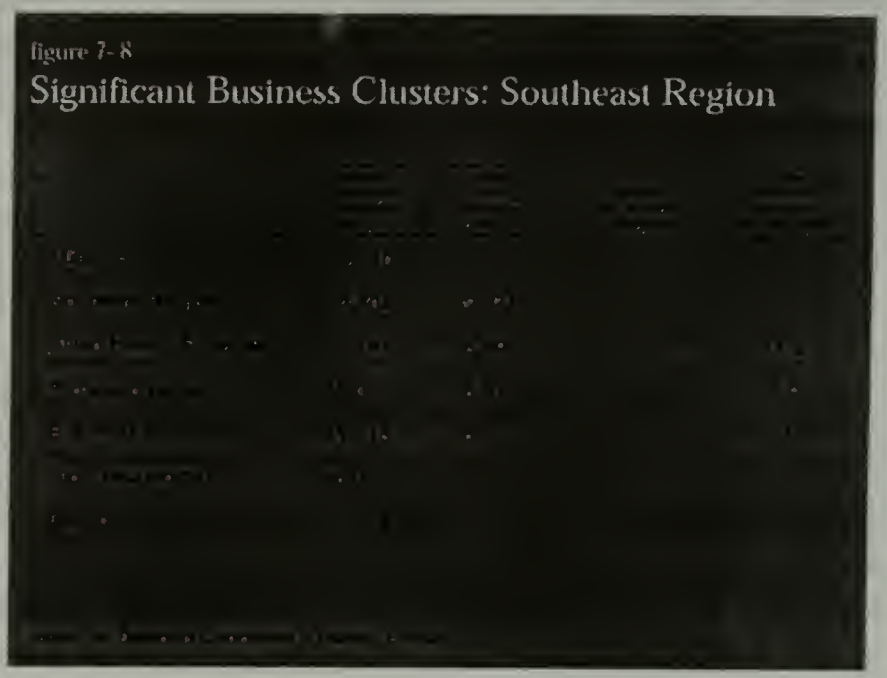
The South Shore area is now largely a suburban adjunct to the Boston metropolitan statistical area (MSA). The area's rapid population growth is the result of commuters moving southward along Route 3 in search of lower housing costs, better schools, and a suburban or rural quality of life. The South Shore's unemployment rate, educational attainment levels, and personal incomes move in tandem with statewide averages because of its close proximity to the Boston MSA.

The South Shore economy is largely dependent on population growth and the local demand for retail trade and services created by Boston commuters. The South Shore's most significant business clusters are allied health services and high-end business services that market to Boston-area businesses, and an increasingly vibrant off-Cape tourism market (see figure 7-9 on next page).

The allied health services cluster, which provides care primarily for the local population, accounted for 9.2 percent of total employment in 2000. Population growth and the availability of Medicare and Medicaid reimbursements for services to the elderly supported growth in this cluster during much of the 1990s.[9] However, government cutbacks in reimbursements and fee caps, cost controls implemented by HMO's and nursing homes, and a slow down in population growth constrained earnings and employment.[10] The sector shed over 100 jobs between 1997 and 2000 and its share of total employment fell from 10.0 to 9.2 percent.

figure 7-8

Significant Business Clusters: Southeast Region



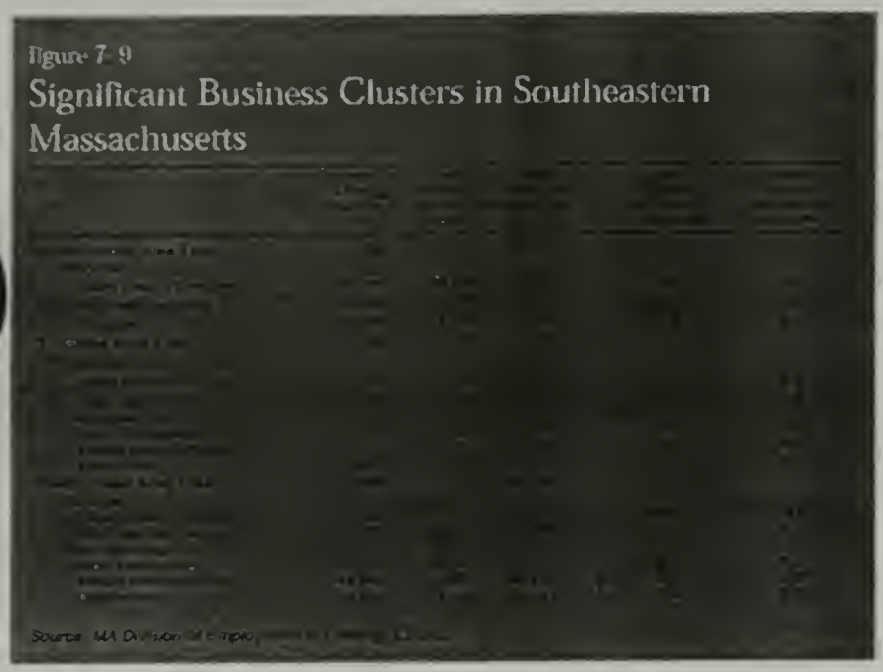
[6] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts, (Boston:, 1993).

[7] Robert Forrant, Philip Moss, and Chris Tilly, (Boston: UMass Donahue Institute, 2001). 8 Estimate based on FY 2000 State room occupancy tax collections, which are levied at 5.7% of the room rate.

[9] Regional Employment Boards of Bristol, Brockton, Greater New Bedford, and South Coastal, *Anatomy of Employment Needs in the Allied Health Industry in Southeastern Massachusetts*, 1995.

[10] Polly Saltonstall, "Hospitals Protest Medicare Cuts," *New Bedford Standard-Times*, July 21, 1999, p. A3.

Figure 7-9
Significant Business Clusters in Southeastern Massachusetts



The business services cluster consists of three major groups: business support (which includes advertising, data processing, photocopying, and computer programming, among other services), engineering and management services, and legal services. The cluster accounts for 8.5 percent of employment, up from 8.1 percent in 1997, and wages are well above the area's average. The employment mix in this cluster is beginning to resemble that of the Knowledge Creation export cluster as it adds more high-wage engineering, legal, accounting, and management services jobs.

Travel and Tourism is a growing cluster in the South Shore. Earnings in the cluster are well below average for the area. The South Shore's attractions are still largely secondary destinations primarily supporting day trips. Several initiatives, however, are being taken to improve and expand the area's appeal for tourists. (see figure 7-9)

The Tri-Cities Area

The Tri-Cities Area consists of 22 cities and towns in Bristol and Plymouth Counties, 21 in the "Southeast Region" proper, and is the largest sub-region in Southeastern Massachusetts. It had a population of 473,159, according to the 2000 Census, 9.9 percent more than in 1990. The area's three cities, Brockton (94,304), Taunton (55,976), and Attleboro (42,068), account for 40.7 percent of the area's population.

The Tri-Cities Area is making a successful transition out of traditional manufacturing and into a postindustrial economy anchored by services and high-tech manufacturing. Its economy has benefited from the southward movement of the Boston metropolitan economy and the northeastward movement of the Providence metropolitan economy. The Tri-Cities Area also has extensive inter-modal transportation linkages and has become a distribution center for the State and Region. It is situated strategically at the intersection of I-495 and Route 24, it has several commuter rail stations and a freight rail interchange, and its three cities are within 30 minutes of major freight airports in Boston and Providence.

As the Tri-Cities Area makes this transition, its unemployment rate has moved steadily downward while its educational attainment and income levels have moved closer to State averages. The cities of Attleboro and Taunton have made noticeable progress in improving educational attainment and income levels and in reducing unemployment.

The Area's economy is still in transition. While manufacturing employment is declining as the area shifts to a service-based economy, manufacturing remains important to towns and cities such as Attleboro and Taunton. Historically, the area's manufacturing base has been concentrated in primary and fabricated metals. However, the metals cluster now accounts for only 1.8 percent of the area's total employment. It has been overtaken recently by a "high technology" cluster, which includes industrial machinery, computer equipment, electronic components, and measuring devices, and accounted for 3.6 percent of employment in 2000 (see figure 7-9). Both manufacturing sectors provide excellent earnings compared to area and statewide averages. While "high tech" has grown slowly in recent years, this cluster contains elements of both the information technology and other manufacturing export clusters which have experienced greater growth in other regions of the State.

However, the service sector is now the fastest growing segment of the Tri-Cities economy. Service-sector growth is led by allied health services and business services, as in the rest of the Southeast Region (see figure 7-9). The expansion in allied health services occurred mainly due to local demand generated by population growth and accounted for 8.6 percent of employment in 2000. The business services cluster has grown from 4.8 to 5.9 percent of area employment between 1997 and 2000. While most jobs in this cluster are concentrated in "low-wage" business support services, such as data processing, photocopying, custodial services, and temporary agencies, there has been a recent surge of employment growth in professional services such as engineering, research, accounting, and management services.

The Tri-Cities Area has also experienced rapid growth of its wholesale and freight distribution sector. The distribution cluster consists of motor freight transportation and warehousing and wholesale trade. The cluster accounted for 9.5 percent of employment in 1997 before declining to 8.5 percent in 2000 (see figure 7-9). Average annual earnings are well above the area and State

average. The Tri-Cities Area is well placed to become a key distribution hub for much of the State and New England. The area's distribution sector has capitalized on the strategic highway, rail, and airport links to several cities, including Boston, Providence, Worcester, Springfield, and New York City. Expansion of the area's numerous industrial/business parks along I-495 has also fueled the distribution sector's recent expansion.

The South Coast Area

The South Coast Area consists of 14 cities and towns in the southernmost part of Bristol and Plymouth Counties. It has a population of 345,610, according to the 2000 U.S. Census, a gain of 1.0 percent since 1990. The area's "twin cities," New Bedford (93,768) and Fall River (91,938), account for 53.7 percent of the area's population. The South Coast is the most economically and culturally-integrated area of Southeastern Massachusetts. Its integration is enhanced by the area's geographic location in the far southern part of the Region, which often isolates the South Coast from the rest of the State. The area's communities are linked together by Interstate I-195, which runs east west through nearly every city and town in the South Coast area.

The South Coast area is quite isolated from the rest of the State. Its highway and rail networks do not provide easy access to the Boston MSA. Nor do they generally facilitate the movement of people or goods to other parts of Southeastern Massachusetts. The South Coast's major highway - I-195 - links the area more closely to the Providence, Rhode Island regional economy. Despite business and housing costs that are well below those found in Boston, the South Coast has capitalized on the State's general prosperity far less than other areas.

Most of the cities and towns in the South Coast area continue to have exceptionally low levels of educational attainment, high dropout rates, above average welfare dependency, and low incomes. Income growth in the South Coast continues to lag statewide trends by considerable margins. Unemployment rates in the New Bedford SDA are still normally at least 50 percent higher than the statewide average. This is the one area of the Region that failed to achieve "full employment" by the end of the last business cycle in 2000.

The South Coast remains more dependent on manufacturing than most other areas of Southeastern Massachusetts. This is the case even though manufacturing employment declined precipitously, falling from 21.1 to 14.4 percent of total employment between 1997 and 2000 (see figure 7-9 on previous page). About one third of this loss occurred in the low-wage apparel industry. Textiles and apparel are nevertheless still the leading employers in the area's manufacturing sector. However, a small but growing high technology export sector has recently emerged alongside the area's traditional manufacturing industries. These firms are concentrated in electronics, medical devices, and marine instrumentation. They pay relatively high wages and accounted for 3.0 percent of area employment in 2000 (see figure 7-9).

However, only the service sector showed significant employment growth over the last few years. As elsewhere in the Region, its expansion has been led by allied health services and business services. The expansion of allied health services in the South Coast has been especially dependent on the availability of Medicare and Medicaid reimbursements for services to elderly and low-income residents[11] which accounted for 13.5 percent of area employment in 2000 (see figure 7-9).

Business services accounted for 4.1 percent of area total employment in 2000. Most jobs in the cluster, however, are concentrated in "low-wage" business support services, where earnings are low and have been stagnant or declining during much of the State's current economic recovery.

The South Coast area has also experienced significant employment growth in its wholesale and freight distribution sector. The South Coast benefits partly from location, but mainly from lower costs and labor availability, which make it an increasingly attractive site for warehousing and distribution. The cluster has grown from 4.9 percent of area jobs in 1997 to 6.0 percent in 2000 (see figure 7-9).

---

[11] *Howard Altschiller, "Second Medicare HMO Dropped in SouthCoast," New Bedford Standard-Times*, October 1, 1999, p. A1.

[12] Data on race must be used with caution. Please see the Introduction to Part II.

Demographics

Population

The Southeast Region had a population of 894,199 in 2000, a 6.6 percent gain over 1990 compared to a 5.5 percent increase for the State. (see figure 7-10)

Resident Age Distribution

The age distribution of the Region's residents is also quite similar to that of the State, with 62.8 percent between 19 to 64 years of age (see figure 7-10). Its population is aging, with the median age rising from 33.5 to 36.6. Assuming an actual average retirement age of 65, approximately 30 percent of the its workforce will retire over the next 20 years, 12 percent over the next 10 years, and 5 percent over the next five years.

The residents of Southeastern Massachusetts are 88.7 percent white, a decline from 93.8 percent in 1990. Blacks are the largest ethnic minority, at 3.7 percent of the population, followed by Hispanics (3.4 percent) and Asians (1.2 percent)[12] (see figure 7-10). Hispanics are the fastest-growing ethnic group in every area of the Southeast Region. While Hispanic immigrants are now arriving from many parts of Latin America, growth is driven largely by immigration from Puerto Rico and the Dominican Republic.

Housing

Home ownership fell slightly during the 1990s, with owner-occupied units decreasing from 63.3 to 61.8 percent. The Region's home ownership rate remained higher than for the State as a whole, however, and the gap actually widened over the decade (see figure 7-11 and 7-12 on next page). A contributing factor was an average price of housing across the Region of $150,545 in 2000, only 73 percent of the statewide average of $205,312. (see figure 7-13). Within the Region, prices vary with higher prices in those communities closer to Boston and along the coast. Much lower housing prices can be found in larger cities like Brockton, Fall River, and New Bedford. (see figure 7-11, 7-12 and 7-13)

figure 7-10

Southeast Region Demographic Summary

45 - 64						
65 and Over						
Race/Ethnicity (share of total)						
White	93.8%	88.7%	-5.1%	89.8%	84.6%	-5.3%
Black	3.0%	3.7%	0.6%	5.0%	5.4%	0.4%
Asian	0.9%	1.2%	0.3%	2.4%	3.8%	1.4%
Other race	2.3%	3.7%	1.4%	2.8%	4.0%	1.2%
Two or more races*	na	2.7%	--	--	--	--
Hispanic (of any race)	1.7%	3.4%	1.7%	4.8%	6.8%	2.0%

* the category of persons with two or more races did not exist in the 1990 Census

Source: U.S. Bureau of the Census, Decennial Population Census

Regional Strengths and Competitive Advantages

The Southeast Region enjoys important economic advantages that make it an attractive location for businesses in the current economy. It is well-positioned to accommodate future growth, as compared to the neighboring congestion of the Boston and Providence regional economies. The Region's particular advantages include its:

Workforce. A significant regional asset is the availability of a loyal workforce with a strong work ethic. It is universally acknowledged that its workforce is highly-motivated, an important characteristic for many industries.

Transportation infrastructure. The Southeast Region is near the major cities of Boston and Providence. Its highway network provides easy access to New York City, to two major airports - in Boston and Warwick, RI, and to the Ports of Boston and Providence. The Region's highway transportation network is adequate to support continued economic development within each of its major sub-regions.

Low business costs. The cost of doing business in the Southeast Region is lower than in most other areas of the Northeast. These costs also compare favorably to highly-developed parts of Northern Europe and Japan. The Region maintains lower costs primarily because wages and real estate costs are lower than in other parts of the State. Commercial electric utility costs and water and sewer rates are also below average thought much of the Region.

Educational resources. The Region benefits from the presence of several institutions of higher education. The institutions enroll more than 32,000 students each year and confer about 220 master's degrees, 3,000 baccalaureate degrees, 2,200 associate degrees, and 35 Juris Doctorate degrees. Approximately 80 percent of the graduates remain in Massachusetts. The Region's higher education institutions contribute in important ways to regional competitiveness by producing skilled professional and technical employees, transferring technology to local companies, and sponsoring cultural events that enhance its quality of life.

The Region has been a major financial beneficiary of the Massachusetts Education Reform Act of 1993. State aid per pupil (K-12) has since increased by $3,150 in Brockton, $2,564 in Fall River, and $2,753 in New Bedford. In FY 1999, expenditures per pupil were $6,836 in Brockton, $7,282 in Fall River, and $6,767 in New Bedford, compared to $6,978 for the State. To the extent that

funding deficiencies have impeded student performance in its urban school districts, one can reasonably expect significant performance gains in coming years.

Land availability. In 1995, the Region had 21 major industrial parks with a mixture of about 6,000 acres of "developed and developable" land. This land remains available as new parks open and existing ones bring new land and buildings into readiness. The State's brownfields legislation is having a noticeable impact in places like Fall River, where older mills and other industrial sites are being redeveloped for new uses.

Quality of life. Despite rapid population growth, the Region has managed to protect large swaths of its natural environment. It also maintains a low cost of living, a low crime rate, ethnic traditions, and a location that affords its residents easy access to several major cities and other attractions. The majority of its suburban schools perform above the State average on the Massachusetts Comprehensive Assessment System test and above the national average on the Scholastic Aptitude Test (SAT). The Education Reform Act of 1993, which requires specific funding levels for all school districts, is also helping many previously underfunded school districts raise the level of educational achievement.

Challenges to Future Growth

The Region faces significant challenges to future growth, particularly in its efforts to expand employment and incomes and achieve educational parity with the State as a whole.

Education and the skills gap. It is generally accepted that two-thirds of new jobs in the United States require some level of post-secondary education. Approximately one-third require at least a baccalaureate degree while another third require a two-year associate's degree or certification by a technical-vocational institute. The most important aspect of skill-based technological change has been the rapid integration of computing technology into virtually every workplace.

The Southeast region's workforce is praised for its motivation and loyalty; however, much of the workforce still consists of unskilled workers with low levels of formal education. The Region's major challenge is to help its workforce obtain new skills and achieve higher levels of education.

The Region's employers have become increasingly concerned about labor shortages, particularly in professional and technical occupations. This shortage is largely due to a mismatch between workforce skills/educational attainment and the demands of new-economy jobs. State-sponsored educational reform and workforce

figure 7- 1.
Southeast Region Housing Supply

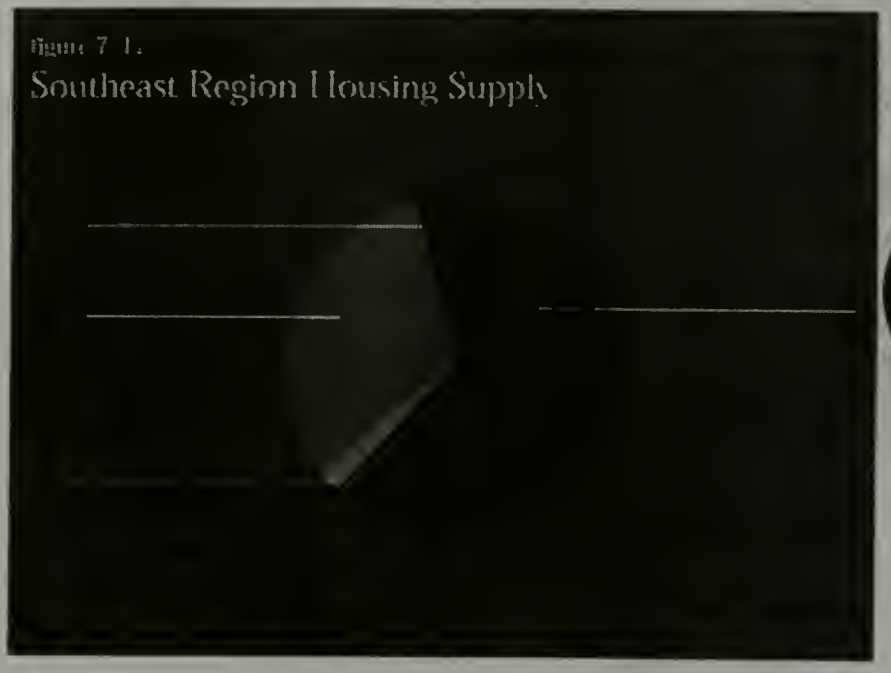


figure 7- 1
Southeast Region Home Ownership

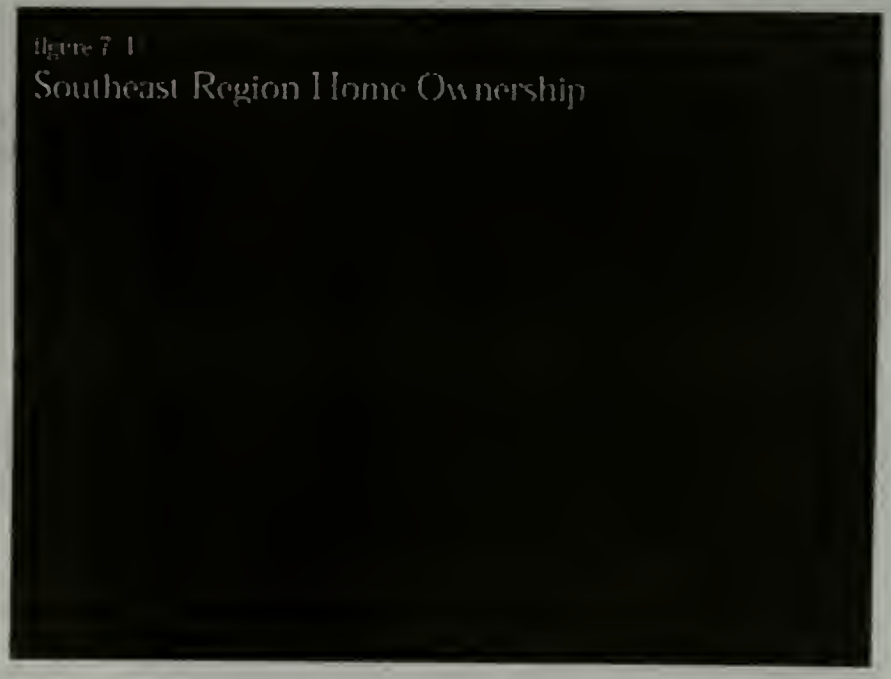
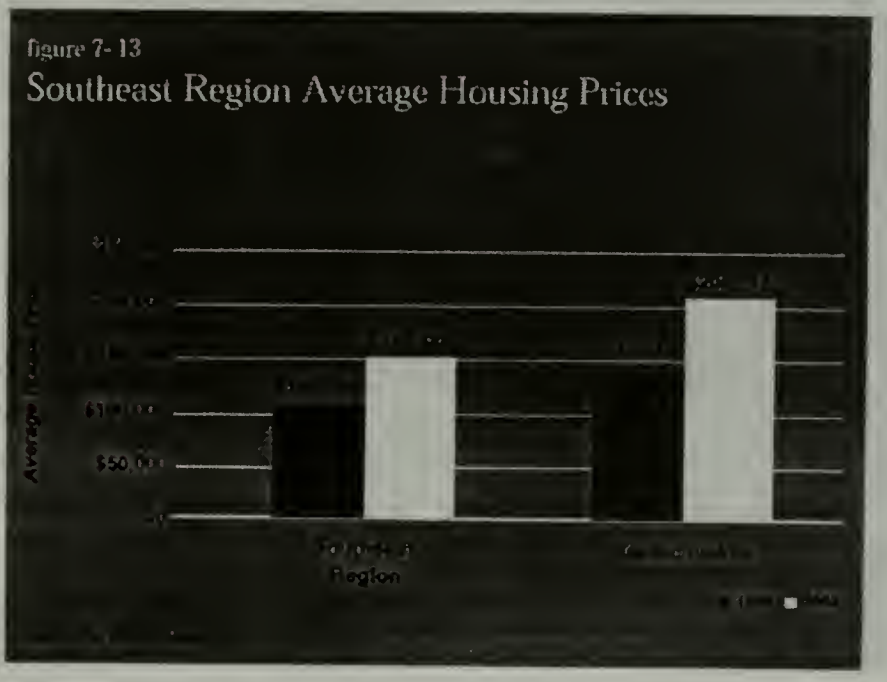


figure 7- 13
Southeast Region Average Housing Prices



development initiatives are crucial to the region's continuing effort to develop a workforce capable of meeting future employment needs.

At the same time, many college and university graduates leave because there are not enough jobs available that match their skills and aspirations. A significant challenge is to find avenues for educated residents to apply their knowledge and skills in the local area, to meet the needs of area employers for educated workers, and to seed further business growth.

Transportation infrastructure. Each sub-region in Southeast Massachusetts has emerged around a major highway artery. The Region's transportation network, however, has not facilitated integrated economic development. The road system ties the South Shore to Boston and connects the Tri-Cities Area to Providence and Boston, but from different directions. The South Coast transportation infrastructure, in particular, has major deficits that must be addressed in the coming decade. The expansion of New Bedford's regional Airport, the extension of commuter rail service from Boston to New Bedford and Fall River, and improvements to the New Bedford and Fall River seaports will better link these cities with the Boston area and provide access to national and global markets.

Municipal infrastructure. Water and sewer lines in many of the Region's cities are nearly 100 years old and need to be replaced or repaired. Recent improvements in Fall River and New Bedford are increasing water and sewer rates significantly, lessening a competitive advantage in local utility rates. Solid waste disposal is becoming a major problem for many municipalities and is likely to remain so for the foreseeable future.

Areas of economic distress. The Southeast Region's economy is improving on the whole, but the South Coast Area continues to lag the State and experienced declines in real income in most of its critical industries. Property values are also lower than in other parts of the Region, especially in the New Bedford-Fall River area, and local governments operate with severe budget constraints that render them highly dependent on State aid.

Figure 7-14
Policy Options for Regional Priorities: Southeast Region

Policy Priority	
Education	
Infrastructure improvement	Commonwealth," pg. 128
Balanced & sustainable growth	See "Massachusetts ensure high quality of life," pg. 126 See "Massachusetts implements housing affordability solutions to support growing businesses and their employees," pg. 129.
Improved business climate	See "Strong export industry clusters throughout Massachusetts", pg. 116 See "Firms in our export industry clusters continually innovate to meet high-value customer needs," pg. 118. See "A statewide climate where entrepreneurs flourish," pg. 120. See "Reduced regional disparities in entrepreneurial opportunities," pg. 120. See "A Strengthened Massachusetts innovation infrastructure," pg. 121

Regional Policy Priorities

Economic expansion in the Southeast Region has been driven primarily by local population growth. A workforce with below-average educational attainment has been its principal constraint to growth. The Region's land use patterns, unemployment rates, and incomes point to continuing structural problems in the regional economy. These underlying structural problems must be addressed before efforts to attract or retain businesses can be successful.

Education. If the Region is to adapt to a changed economy it must improve its educational systems. Central to this mission are standards-based strategies, efforts to increase high school retention, initiatives for improving the literacy and basic skills of incumbent and potential workers, and additional funding for workforce training linked to economic development and business needs.

Infrastructure improvement. As indicated above, the Region is in serious need of municipal and transportation improvements. Projects should proceed that build on its current strengths and promote development in the agriculture, fishing, aquaculture, distribution, travel and tourism, and textiles. Once such infrastructure investments are in place, the Region needs to aggressively market these new opportunities.

Balanced and sustainable growth. In October 2000, the Vision 2020 Task Force asked the Region's communities to join a "New Mayflower Compact" that commits them to a set of forward-looking land use and economic development strategies. Forty communities signed the New Mayflower Compact, which includes several detailed recommendations for achieving balanced and sustainable growth.[13] Executing that program is a high priority for the Region.

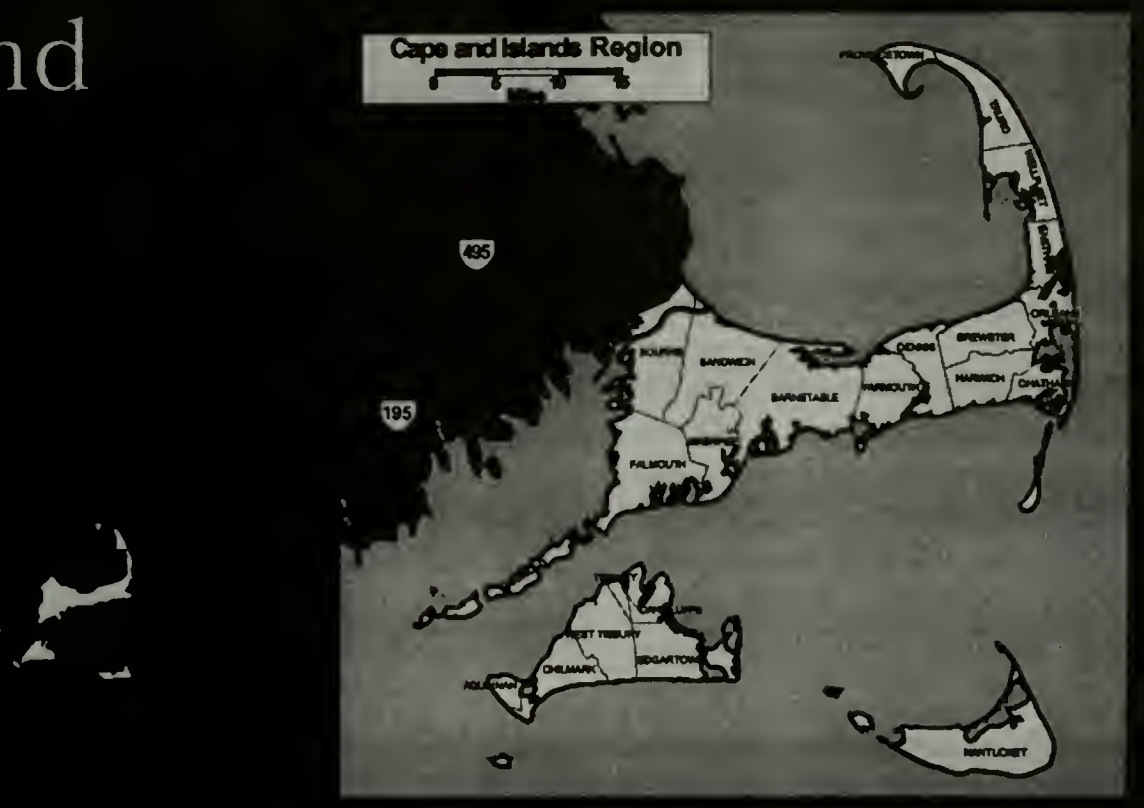
Improved business climate. While the business climate in the Southeast Region has improved over the past decade, there is still a need to promote innovation and entrepreneurship.

Linking the Region's Policy Priorities to Potential Solutions

Part III provides a variety of policy options that can help address the Region's economic development priorities. Figure 7-11 shows where to find relevant options.

13 For details on the Mayflower Compact's recommendations, see http://www.semassachusetts.org/compact.htm.

cape and islands region



The Cape and Islands Region extends south and east into the Atlantic Ocean from the southeastern-most point of the Commonwealth. The landscape and economy of the long hooked Cape and its companion islands have always been dominated by the sea. Fishing, whaling, water borne trade, and a bit of agriculture were once the foundation of this region's economy. Today, it's the recreational, aesthetic, and naturalistic appeal of the sea – and the unique access the Cape and Islands provides to millions of tourists, retirees and part-time and full-year residents who earn their income elsewhere – that drives its rapid growth.

The Cape Cod and Islands Region consists of 23 towns in Barnstable(Cape Cod), Dukes(Martha's Vineyard), and Nantucket Counties. It occupies 551 square miles and has a population of 246,737. Barnstable County accounts for approximately 90 percent of the total population, employment, personal income, and 72 percent of its landmass. The islands of Martha's Vineyard and Nantucket lie in Nantucket Sound to the south, at roughly seven miles and thirty miles offshore, respectively.

The Cape and Islands Region is accessible by road via the Sagamore (Route 3) and Bourne (Route 25) bridges. Routes 3, I-495, and I-195 all converge near the upper Cape and provide quick access to destinations west and north. Auto and passenger ferry service to Martha's Vineyard and Nantucket is offered from Falmouth and Hyannis on the Cape. Passenger ferry service between Boston and Provincetown operates during the summer months, and between Martha's Vineyard and New Bedford from May through September. The Region is also served by air and bus transportation.

Economic Overview

Since 1990, the Cape Cod and Islands has been the fastest-growing region in Massachusetts, as measured by the growth of its population, workforce, and total employment. More than half of its economic base depends on tourism, retirees, second-home owners, and Cape and Islands residents working in other parts of the State.[1] An estimated six million tourists visit Cape Cod each year, with nearly two-thirds of all visitors arriving in the summer and early fall. The Region's economy is also highly volatile because it depends on factors such as the weather and economic conditions in regions that supply its tourist trade.

Cape Cod has made more significant strides than the Islands in diversifying its economy, though tourism continues to be the economic engine for Barnstable County. Diversification on Martha's Vineyard and Nantucket is more problematic because of their isolation from the Cape and other areas of the State. It is likely that tourists, seasonal residents, and retirees will continue to be the primary economic supports for all three counties.

Employment

The number of residents employed increased from 99,744 to 113,552 during the economic expansion between 1993 and 1999, an increase of 13.8 percent[2] (see figure 8-1).

The number of jobs in the Region grew faster, rising 24.5 percent – nearly twice the statewide pace – from 78,792 in 1993 to 98,098 in 1999. Employment increased most sharply on the tourism-focused Islands of Martha's Vineyard (38.2 percent) and Nantucket (36.4 percent) than on the more diversified Cape (22.8 percent).

Unemployment has been higher in the Region than in the State throughout this business cycle. However, the gap declined steadily during the 1990s and jobless rates are now falling into line with statewide trends. The average regional rate in May 2001 was 3.9 percent, compared to the statewide average of 3.4 percent (see figure 8-2). Unemployment remains highly seasonal, based on the resort industry's employment needs. For example, the rate was 2.1 percent in July of 2000, below the Commonwealth's 2.8 percent, and 6.9 percent in January 2001, more than twice the statewide average of 3.1 percent.

figure 8-1
Cape and Islands Region Labor Force and Employment

figure 8-2
Cape and Islands Region Unemployment Rate

Income

Average annual real wages[4] in the Region were $29,631 in 1999, 37 percent below the statewide average of $40,355 (see figure 8-3). The resort industry has a significant impact on annual wage levels, with earnings below statewide averages due to seasonal unemployment and the large number of jobs in low-wage service occupations. While average annual wages in tourism-oriented Martha's Vineyard were below the regional average, at $27,072, they were higher on Nantucket, at $32,130.

Wage data alone convey an overly pessimistic picture of residents' economic situation. Much of the seasonal volatility and low-wage jobs are filled by students and temporary foreign workers, who migrate to the Cape and Islands during the resort season, specifically for temporary employment. Many seasonal jobs are also held by moonlighters, homemakers, and retirees, who supplement family income by working only during the resort season.

For year-round residents, total personal income (from all sources) compares favorably to the figures for the State as a whole. Per capita personal income for the Cape and Islands is $34,932, 98 percent of the statewide average of $35,527. Per capita income is significantly higher on Nantucket, at $46,354.

figure 8-3
Cape and Islands Region Average Real Wages

[1] Clyde Barrow. "Cape Cod and the Islands: More than a Resort Economy", *Massachusetts Benchmarks* (Summer 2001).

[2] The data in this section on the number of people employed, in the labor force, and unemployed are taken from the household survey. They will not match the employer-based data used in other sections that report the number of payroll jobs.

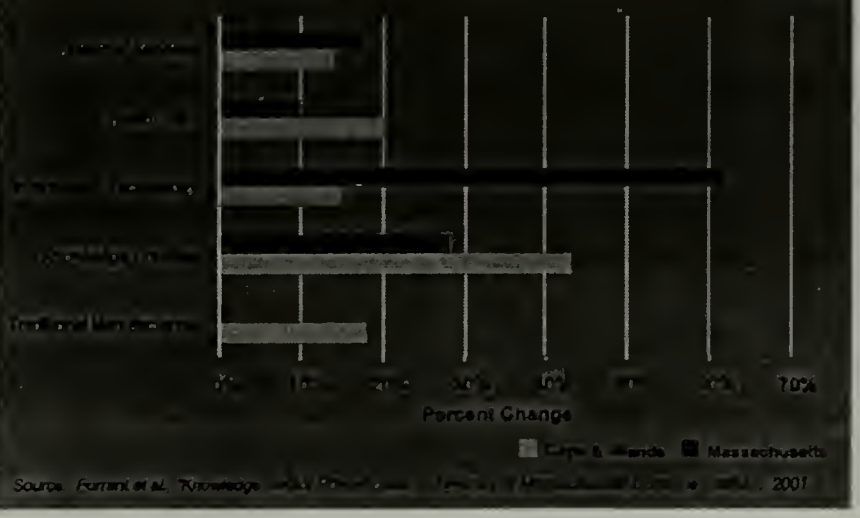
[3] Employment is measured here using the Bureau of Labor Statistics, ES-202 series, which are employer reports of payroll jobs rather than household-based measures of employed or unemployed people. As a result, the numbers will differ from employment figures based on the household survey presented in other sections of the document.

[4] The U.S. consumer price index (CPI) was used to adjust nominal wages for the effects of inflation.

figure 8-4
Cape and Islands Region Employment by Major Industry

figure 8-5
Cape and Islands Top 5 Industries, by Employment

figure 8-6
Employment Change in the Commonwealth's Export Clusters: Cape and Islands Region, 1993 to 2000



Employment by Major Industry Sector

The three largest employers in the Region are services, retail trade, and construction. During the expansion from 1993 to 2000, job growth in agriculture, construction, and government was significantly stronger than in other industries (see figure 8-4).

Figure 8-5 lists the Regions largest industries, in terms of employment. Most of these industries are in the service and retail trade sectors of the economy.

The Cape and Islands Region Export Sector

As explained in Chapter 2, a healthy export sector is critical to a region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's export sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[5] and the more recent *Knowledge Sector Powerhouse*[6]. They include four Knowledge-based clusters – Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive: Travel and Tourism, and "Traditional Manufacturing," manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery, that are not part of the Information Technology or Health Care clusters. The discussion below uses this framework to explore the Cape & Islands Region's export sector.

Figure 8-6 shows export cluster growth in the Region, as compared to Massachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The Health Care cluster, for example, includes physicians serving the local population. A finer picture of the composition of the Region's export sector, and the extent to which it has become part of the wider knowledge-based economy, is developed in the discussions that follow.

In 2000, the four knowledge-intensive export clusters (Knowledge Creation, Information Technology, Health Care, and Financial Services) accounted for less than 25% of the total employment in the Cape and Islands.

Critical Industries of the Cape & Islands Region

A review of five critical industries provides a more comprehensive analysis of the Region's economy. These industries shown in figure 8-7, account for large shares of the Region's employment and wages.

The Resort Industry Cluster

The Resort Industry Cluster is by far the largest component of the Region's export base. An estimated six million visitors come to the Cape and Islands each year – largely from Massachusetts, New England, and Mid-Atlantic states – and they spend nearly $1 billion annually.[7] While the Region's year-round economy has grown significantly over the last decade, the resort industry remains highly seasonal. Room demand on the Cape alone declines by 50,000 to 100,000 rooms per month from the peak summer months to the industry's winter trough. The industry is also highly sensitive to factors such as weather and the economic condition of other regions and states that fuel its tourist trade.[8]

The resort industry is defined as including eight major industry groups: general merchandise stores, food stores, apparel and accessories, eating and drinking places, miscellaneous retail, hotels and other lodging places, amusement and recreation services, and museums.[9] The cluster accounted for 21.0 percent of regional employment or 21,297 jobs in 2000. Adding effect of indirect and induced impacts, the resort industry generated approximately 40 percent of its total employment. While employment grew 12 percent over the expansion years since 1993, its overall share of employment declined from 24.2 percent. While this decline highlights growing diversification, the resort industry is expected to remain at the core of the Cape and Islands economy. The activities that showed significant net gains over this period were amusement and recreation services (+41.0 percent or 557 jobs) and miscellaneous retail (+29.1 percent or 844 jobs).

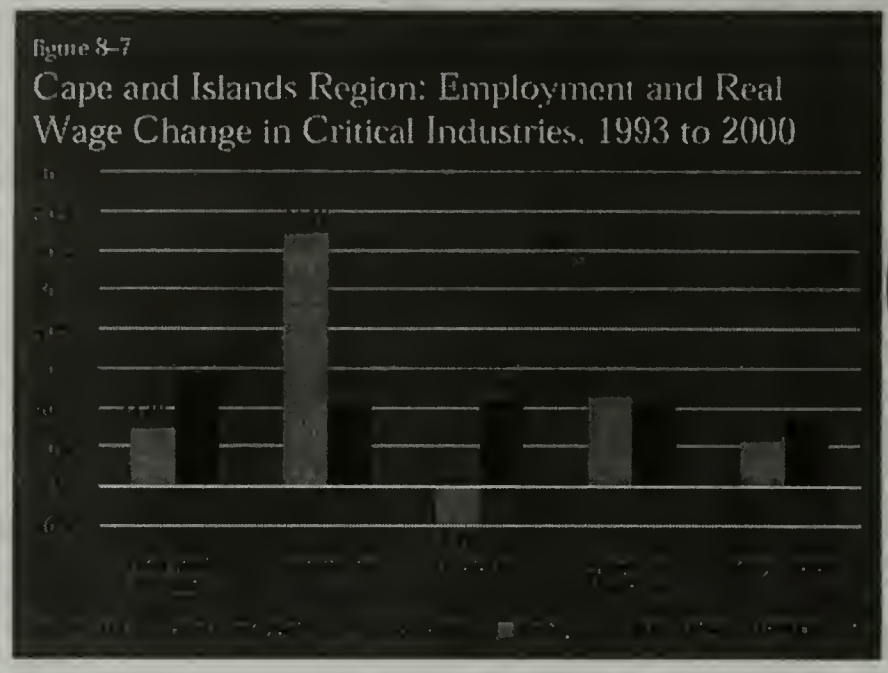
The average annual wage in the Cluster is $18,793, significantly lower than the regional average of $29,631. Real wages, nevertheless, increased by 17.7 percent between 1993 and 2000.

Construction

The construction industry[10] accounted for 7.2 percent of jobs in 2000, an increase from 64.2 percent at the beginning of the expansion in 1993. The industry is cyclical with employment growth highly sensitive to the overall health of the economy. It is not clear what share of recent employment gains is cyclical as opposed to permanent, long-term growth. There is also a question of whether construction will remain a critical industry as the Cape and Islands Region reaches its "build-out" limit (see figure 8.7).

High Technology

The high technology cluster consists of five major industry groups: industrial and commercial machinery (including computers), electronic and other electrical equipment, measuring and analyzing equipment, communications, and drugs. The cluster accounted for nearly 2,000 jobs in 1993, 2.5 percent of the region's total. But high tech manufacturing shed jobs throughout



the nation in the 1990s, and this was also the case in the Region. Employment fell by 9.4 percent and the cluster's share of the region's total decreased to 1.7 percent (see figure 8-7). Many of the jobs are concentrated in a small number of firms, with communications accounting for more than 40 percent of the total.

Average annual wages in the industry are well above the regional and State averages at $46,475 in 2000 and increased, after inflation, 21.1 percent over the 1993-2000 expansion.

Professional Services

Professional services consists of five major groups: legal services, engineering, accounting, research, management, advertising, computer programming and data processing, and educational services. This cluster accounted for 11.9 percent of the Region's employment in 2000, a decrease from 12.5 percent in 1993. Total employment in the industry increased 22.5 percent between 1993 and 2000 (see figure 8-7 on previous page). Employment gains are being fueled by engineering, accounting, and research (+817 jobs)

---

[5] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts, (Boston, 1993).

[6] Robert Forrant, Philip Moss, and Chris Tilly, (Boston: UMass Donahue Institute, 2001).

[7] ArtsMarket Consulting, Inc., *Tourism Market Study Analysis: Visitors to Cape Cod* (Barnstable, Mass.: Cape Cod Chamber of Commerce and Cape Cod Times, 1995); Commonwealth of Massachusetts, *Convention and Public Assembly Facilities Market and Feasibility Study: Cape Cod Region* (Boston: Executive Office of Administration and Finance, 1998).

[8] Hunter Interests, Inc., *Economic Analysis: Cape Cod Tourism Expansion Strategy*. Barnstable, Mass.: Cape Cod Economic Development Council, 1996.

[9] In calculating the direct economic impacts of the resort industry, it is estimated that 35 percent of total annual average employment in general merchandise, apparel and accessories, and food stores is tourist-related based on summer sales figures shared with the principal investigators. It is estimated that 75 percent of total annual average employment in miscellaneous retail and eating and drinking establishments is tourist-related. It is estimated that 100 percent of total annual average employment in amusement and recreation, museums, and lodging establishments is tourist-related.

[10] The construction industry consists of general building contractors, heavy construction, special trade contractors.

and computer programming (+262 jobs). The engineering, accounting, research and management consulting industry accounts for the highest level of employment (3,139), followed by educational services (972), computer programming (767), legal services (653), and advertising (87).

Average annual wages in professional services are $38,527, which is 21.1 percent higher than inflation-adjusted pay in 1993.

Health Services

Health services[11] account for 10.0 percent of jobs, a decline from 11.3 percent in 1993. The average annual wage is $38,540, which is higher than the Region's annual average wage of $29,631. This compares to an annual average wage of $26,293 in 1993. Real wages have increased by 28.7 percent over this period. Population growth, particularly among retirees, and the availability of Medicare and Medicaid reimbursements for services to the elderly and low-income residents have supported growth in this industry during much of the 1990s. However, government cutbacks in reimbursements and fee caps, as well as cost controls implemented by HMO's, hospitals, and nursing homes are now constraining employment and wage growth in this industry.

Demographics

Population

The Region has a population of 246,737. This reflects a 20.8 percent increase during the 1990s, the largest gain in the Commonwealth. Retirees and commuters to the South Shore and Boston fueled much of this growth, which is placing increasing pressure on its existing infrastructure and environment. Nantucket had the highest rate of population growth (58.3 percent), followed by Martha's Vineyard (28.8 percent), and Barnstable County (19.1 percent).

figure 8-8

Cape & Islands Region Demographic Summary

Black	1.6%	2.1%	0.5%		5.4%	6.4%
Asian	1.5%	.6%	0.1%		.6%	4%
Other race	.8%	.8%	0.0%		4.0%	2%
Two or more races*	na	1.8%	na	na	2.3%	na
Hispanic (of any race)	1.2%	1.4%	0.2%	4.8%	.8%	2.0%

* = The category of [illegible] with two or more races [illegible]

Source: Census [illegible] Census 2002

Resident Age Distribution

As the Region is home to a large number of retirees, the median age of the region's residents (44.3 years) is the highest in the Commonwealth and significantly higher than the median age in the State (36.6 years). The percentage of Cape and Islands residents who are aged 19 to 64, the years when most people are in the full-time workforce, is 57.4 percent. This compares to a statewide average of 62.8 percent (see figure 8-8).

More than 90 percent of Cape and Islands residents are White. This compares to 84.5 percent statewide. At 5,117, Black residents represent largest ethnic minority in the Region.[12]

The Region has a more educated population than the State as a whole. This may be attributed to its large retirement community. Nearly 90 percent of all Cape and Islands residents have high school diplomas, compared to 80 percent for the State. Cape and Islands residents are slightly more likely to have bachelor's degrees or higher – 28.4 percent versus 27.2 percent statewide.

Housing

The supply of moderately-priced housing for year-round Cape and Islands residents and seasonal workers is shrinking. The average home price for the Region in 2000 was $208,771, compared to $205,312 for the State (see figure 8-9). This represents an increase of 68.3 percent since 1996, compared to a 47.7 percent gain for the Commonwealth. The average home price is 36.9 percent below the Boston average ($281,051).

The Cape and Islands Region continues to attract an influx of comparatively affluent commuters to Falmouth, Sandwich, and Mashpee. This demand serves to drive up prices and create serious affordability issues for many long-term residents who work on the Cape. A similar dynamic is at work on the Islands, as seasonal residents purchase summer and retirement homes.

The percentage of owner-occupied homes has decreased significantly in the past decade. In 1990, 71.9 percent of homes were owner-occupied. This fell to 47.2 percent in 2000, as high rental income encouraged homeowners to rent, rather than occupy, their homes (see figure 8-10). New construction of seasonal second homes is also on the rise.

More than one-third of the Cape's housing is for seasonal, recreational, or occasional use (see figure 8-11). This demand leaves a relatively smaller share of the Region's housing stock available to year-round residents.

Regional Strengths and Competitive Advantages

The Cape and Islands Region has many strengths and competitive advantages, including an attractive quality of life, focused land use and economic development planning, high educational attainment levels, and skilled retirees.

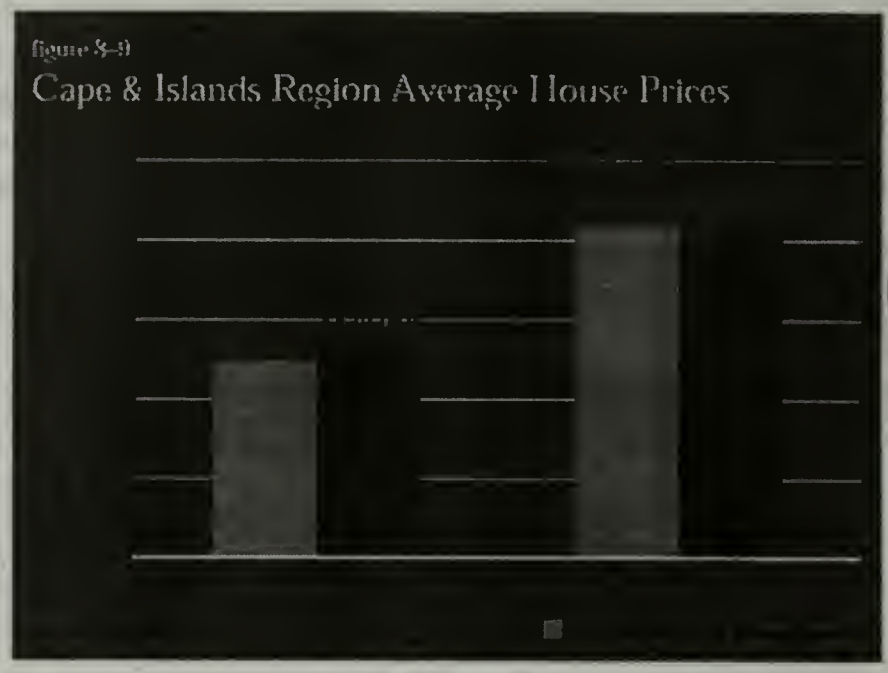
Quality of life. The Region's natural environment, quality school systems, low crime rate, climate, and location afford its residents a high quality of life. Its ecosystem, defined by pristine beaches, beautiful oceans and bays, quaint villages, and a diverse mix of plant and animal life, is fragile. While geography makes it relatively remote, it is still close to major population centers.

Environmental factors are key to attracting tourists and retirees. A location on the water also presents opportunities for expanding research in aquaculture, environmental science, marine science, and sport fishing. For example, the Woods Hole Oceanographic Institute is the largest independent ocean-ographic institute in the world. Aquaculture is also a burgeoning industry, although success has been hampered by local environmental regulations.

Land use and economic development planning. The Cape and Islands is the only Region in the State with regional planning agencies exercising genuine controls over land use and development. The Cape Cod Commission and the Martha's Vineyard Commission were created to ensure a balance between sustainable economic development and the environment. To preserve its quality of life for residents and tourists, the preservation of historical and natural attractiveness dominates land use and economic development planning.

Educational attainment. The Region's relatively high level of educational attainment provides an opportunity to develop emerging industries in high-technology areas such as marine technology, software engineering, and environmental technology. Economic development plans emphasize a balance of economic redevelopment, historic preservation, and environmental conservation.[13] As a result, economic development officers are seeking "light-clean" industries, such as high technology, professional services, and communications firms.

Skilled retirees. Retirees make up roughly one-fourth of the Cape and Islands population, a proportion which increases each year. It is estimated that this group of year-round and seasonal residents now comprise 11.9 percent of the Cape's seasonal workforce.[14] Many of







[11]Health services include hospitals, nursing homes, home care providers, health maintenance organizations, medical laboratories, rehabilitation facilities, group medical practices, and individual practitioners.

[12]Data on race and ethnicity must be used with caution. Please see the Introduction to Part II.

these retirees possess skills and experience that can benefit the regional economy, especially in the areas of high-tech and professional services. The key is for the Region to develop strategies that take full advantage of the workforce skills of this population.

Educational institutions. The Region benefits from having a two-year community college and the specialized programs at the Massachusetts Maritime Academy and Woods Hole Oceanographic Institute that attract many skilled individuals. Graduates of these programs often establish businesses in the Region.

Challenges to Future Growth

The Region faces several challenges, particularly balancing the environment with economic growth, land availability for business growth, traffic and lack of public transportation, housing affordability, Internet access, and seasonal labor shortages.

Protecting the environment. While tourist and seasonal resident spending is vital to the Cape and Islands economy, the growing number of tourists also threatens its fragile environment. Thus, much regional planning is focused on balancing economic growth with environmental preservation. Economic development planners consequently emphasize the recruitment and development of light-clean industries, such as high-technology firms. These types of industries generally provide high-wage jobs while having less impact on the environment than traditional manufacturing. While tourism will remain the region's economic base, attracting other types of industries will help diversify the economy, making it less susceptible to economic downturns in the tourist industry brought on by bad weather or adverse economic factors.

Land availability. Because much of the region's land is already developed or set aside for open space, agricultural, or other non-developable uses, there is not much land available for business development. The Cape Cod Commission has addressed this issue by introducing the concept of growth activity centers, which encourages intensive development in areas that already have adequate infrastructure and are currently underutilized.

Location and isolation. While the Region's isolation lends to its attraction as a tourist destination, it is a hindrance in attracting other types of businesses. The transportation infrastructure does not facilitate the easy movement of workers and goods within the Region or to off-Cape destinations. The isolation of Martha's Vineyard and Nantucket is even greater, with goods having to be shipped or flown to these destinations.

Transportation infrastructure. With population increases and success in lengthening the "shoulder seasons" in the resort industry, the Cape's traffic congestion is becoming a year-round problem. About 35 million vehicles cross the Cape Cod Canal annually, a figure that has doubled since 1976.[15] Many of the Region's bridges and roads are in need of repair and eventually will need to be replaced.

The public transportation network on the Cape is neither well-developed nor particularly extensive, which makes it difficult for some workers – especially foreign temporary workers –to get to their jobs.

Housing affordability. As housing costs rise and availability declines, affordable housing is no longer a "low-income" problem. Housing prices are having an impact on wage levels, which drive prices in the tourist industry in an upward spiral.

The Cape's growing reliance on J1 (foreign student) and H2B (foreign temporary) workers has also made housing availability and costs salient to employers. The H2B program and many foreign university work-abroad programs require employers to arrange and guarantee housing for prospective employees and interns. A survey found that 27.2 percent of the Cape's resort industry employers currently provide housing or a housing subsidy for seasonal employees.

Retaining skilled workers. The lack of affordable housing is creating an environment where employers are having difficulty recruiting and retaining employees. Many employees outside the Region are reluctant to fill job vacancies because of high housing costs. College graduates who grew up here would like to return for work, but often cannot afford to do so.

Seasonal labor shortages. There is an acute shortage of unskilled and semi-skilled seasonal workers in the resort industry. During summer and early fall, Cape Cod is reaching or exceeding full employment. However, unlike most other parts of the State, its labor shortage is mainly among unskilled and semi-skilled seasonal workers. While a portion of the labor shortage can be attributed to low unemployment, housing and rental costs are creating major difficulties for employers to recruit seasonal workers.

There are concerns about how the Region can continue to maintain its lengthening tourist season without a steady supply of seasonal workers. This problem is especially acute on the Islands, where rents are very high and housing availability is slim.

Workforce skills, education, and training. As in many areas of the State, workers and potential workers in the Cape and Islands Region suffer from basic skills deficits, especially in the areas of Math and English. This makes it difficult for individuals to compete in the economy and for the region to attract technical and pro-

fessional businesses. While the Region has higher educational attainment levels than the State as a whole, there is a concern that some of its year-round residents do not have the skills to meet the needs of local employers.

Spending increases mandated by the Education Reform Act of 1993 have not kept pace with rising enrollments and costs. While enrollments and mandated spending increases grow, property tax increases are constrained under Proposition 2 1/2. Many communities are in the position of having to provide services to a growing population of students at a time of budget shortfalls. These shortfalls have limited the ability of some school districts to institute or expand needed programs.

Telecommunications infrastructure. Many businesses and organizations need access to advanced communications networks. The Woods Hole Oceanographic Institute and spin-offs in the marine sciences and other high tech industries are critical examples. The Region, however, currently has limited affordable high-speed Internet access.

Wastewater treatment. Cape Cod and the Islands are continually faced with water and sewer infrastructure concerns, as the area experiences rapid growth in environmentally-sensitive areas. These concerns are exacerbated by the fact that the Cape is served by a single-source aquifer. The shallowness of this water source makes it especially vulnerable to contamination. Adding to this risk is the fact that 87 percent of the region's housing uses septic systems. The increasing population density on the Cape is causing septic seepage into water systems, including inland water, bays, and estuaries.

Regional identity. There is a perception that the State does not understand the needs of the Cape and Islands. The Region has not developed an identity that unites the voices of individual communities, focuses the attention of State policymakers, and assures State legislators that in supporting the region they are meeting the needs of a substantial constituency. However, such a strategy must be balanced against the need to maintain the village identities of the Region's communities.

Regional Policy Priorities

Expanding tourism shoulder seasons. The Region has significant excess capacity in off-peak spring and fall shoulder seasons. The Cape Cod Chamber of Commerce is aggressively pursuing initiatives to expand visitation. Initiatives include attempts to attract small conferences and visitors for getaway weekends from nearby metropolitan areas.[16]

Transportation infrastructure. The Region must continue current work on the transportation infrastructure and consider expanding that work to areas in which further transportation improvements can significantly aid economic development. The Cape Cod Commission and the Cape Cod Metropolitan Planning Organization recently have begun studying the Region's transportation needs, including bridges. It is clear that transportation improvements or new options will be needed. Additionally, the Region needs to develop an efficient public transportation system to alleviate traffic congestion.

Wastewater treatment. As part of its economic development strategy, the Region is seeking to make zoning changes that will allow for dense urban-area clusters and allow residential housing above commercial buildings. Density can only occur, however, with adequate wastewater treatment facilities. The region needs a strategic solution to wastewater treatment, and it will need financial assistance in building treatment facilities.

Public-private networks. The Cape and Islands economy has long been distinguished from other regions of the State by its reliance on small businesses and proprietorships. Public-private networks that enhance the competitiveness of small businesses are needed. These networks can facilitate access to State resources that allow them to expand and remain here. Many businesses are not aware of the types of assistance that are available from the State.

The State should also encourage the investment of venture capital in the Region and/or establish a privately managed seed venture capital fund to support the development of emerging and entrepreneurial industries. Another way that the State can help smaller businesses is to offer more on-line services to businesses and to promote the development of on-line services at the local level.

Communications infrastructure. Due to environmental concerns, Cape Cod has focused much of its job creation strategy on attracting light, clean industries – exactly the industries that require an advanced information infrastructure. Unfortunately, there is limited access to affordable high-speed Internet services. The Cape Cod Technology Council, the Cape Cod Chamber of Commerce, the Massachusetts Technology Collaborative, and the Cape Cod

---

[13]Cape Cod Commission, Cape Cod Regional Policy Plan (Barnstable, Mass., 1996); Victor Gautam, "Cape Cod and the Islands: Working Toward a Sustainable Year-Round Economy," Massachusetts Benchmarks (Winter 1999): 19-23.

[14]Barrow, Clyde W. and David Borges. Help! Wanted–Cape Cod's Seasonal Workforce. Cape Cod Commission. October 2000.

[15]Cape Cod Transit Task Force, 2001

[16] Michael J. Gill & Associates 1984; Commonwealth of Massachusetts 1994.

Economic Development Council are beginning to address this need by collaborating to upgrade the Region's telecommunications infrastructure through "Cape Cod Connect."

Expand resources for higher education. There is very little technology transfer occurring in the Cape and Islands Region. The Woods Hole Oceanographic Institute provides specialized training in many emerging fields. Yet beyond the Massachusetts Maritime Academy, there is no four-year college or university in the Region. While it is ripe for development in several high-tech areas, including marine sciences, environmental sciences, and software development, there are very few avenues for enhancing technology-based economic development.

Small businesses rarely have the resources to keep abreast of best-practice methods of production and management, and consequently do not take full advantage of available technologies. The Region lacks a major research university that could help local businesses access these resources.

Workforce development. The Region and the State must continue to work together to provide a career education system that links K–12 education, higher education, and workforce development with employment to achieve a workforce that is prepared for new business challenges. As is the case across the State, many students and workers in the Cape and Islands Region suffer from a basic skills deficiency.

Public schools, especially vocational schools, need to develop programs that address the needs of employers and the entrepreneurial economy. Not all high school graduates will go on to college, and thus it is important to "match" the skills of these graduates with business needs. The skills being taught in the schools should mirror the needs of the economy.

Finally, worker preparedness is an important issue. This includes getting to work on time, dressing appropriately, and having good interpersonal skills. This is especially important considering the prevalence of the Region's hospitality industry. State agencies, workforce investment boards, institutions of higher education, and businesses must cooperate in creating workforce development programs that meet the needs of both workers and employers. Workforce investment boards must be adequately funded by the State for workforce development efforts to be effective.

Linking the Regions Policy Priorities to Potential Solutions

Part 3 provides a variety of policy options that can help address the Region's economic development priorities. Figure 8-12 shows where to find relevant options.

figure 8–12
Cape & Islands–Policy Options for Regional Priorities

Expanded resources for higher education	"A strengthen[illegible] in astructure, pg. 121 See "Worker skills match the needs of business and the competitive environment," pg. 124.
Workforce development	"Worker [illegible] match the needs of bu[illegible] and the competitive environment," pg. [illegible] "Our [illegible] they [illegible] to succeed," pg. 123

central region





Worcester County lies at the center of Massachusetts and it largely defines the Central Region of the Commonwealth. Economic flows here have traditionally run north and south along the Blackstone River Valley – a natural link connecting the city of Worcester to Providence, Rhode Island. The Providence and Worcester Railroad runs through the valley and ties these two urban centers together. So does Route 146, a newly-expanded north-south highway. Both Providence and Worcester have their own airports, with T.F. Green in Providence providing an alternative to Boston's Logan International Airport for domestic flights. The development of new knowledge-based industries over the past decade, however, has enhanced the Region's ties to the east, and especially to the Greater Boston economy.

Central Massachusetts is commonly divided into three distinct sub-regions running from north to south: North- Central [1], Metro Worcester,[2] and the Blackstone Valley [3].

- The North-Central has the highest concentration of manufacturing employment in the Region. It is home to a large number of plastics and furniture manufacturers, primarily based in Fitchburg, Leominster, and Gardner. For a description of the sub-region's plastics industry, see Chapter 2.[4]

- At the center of the Region lies Worcester, New England's third largest city. Through the nineteenth century, rivers, then steam powered industrial mills were key to the city's economy. While manufacturing remains important, the Worcester metro area has become the region's trade and service center. The biotechnology industry has also taken hold, offering a significant opportunity for long-term growth.

- The Blackstone Valley was the initial home of the nation's industrial revolution and the sub-region, like the North Central, retains a significant manufacturing orientation. Route 146, a newly-expanded highway from Worcester and Providence, has already begun to effect development in the sub-region, becoming a significant conduit for travel and trade both within the Region and across state lines.

While data at the sub-regional level of analysis are limited, figure 9-1 indicates the industry structure of the three sub-regions of Central Massachusetts.

There is little evidence of significant economic exchange between Central Massachusetts and regions to the west. The Quabbin Reservoir, the Commonwealth's chief source of drinking water, runs north and south along the Region's western border and blocks development into the Pioneer Valley. On its eastern fringe, however, the I-495 corridor has grown substantially in recent years, bringing companies and people to towns like Westborough and Northborough. The fringe of the Boston economy is now on the doorstep of central Massachusetts, and the Region is feeling the effects of this development.

Economic Overview

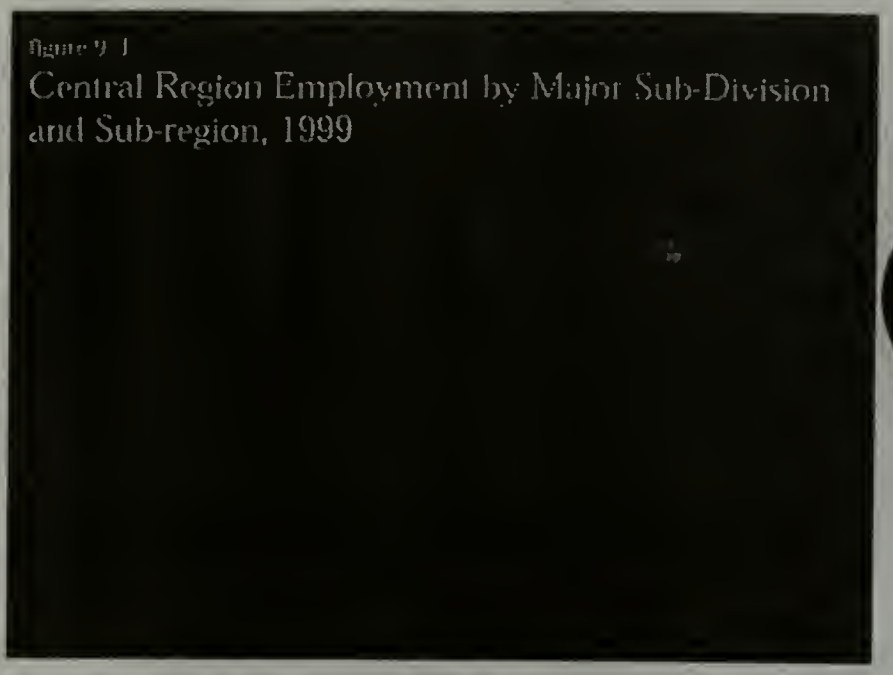
Employment[4]

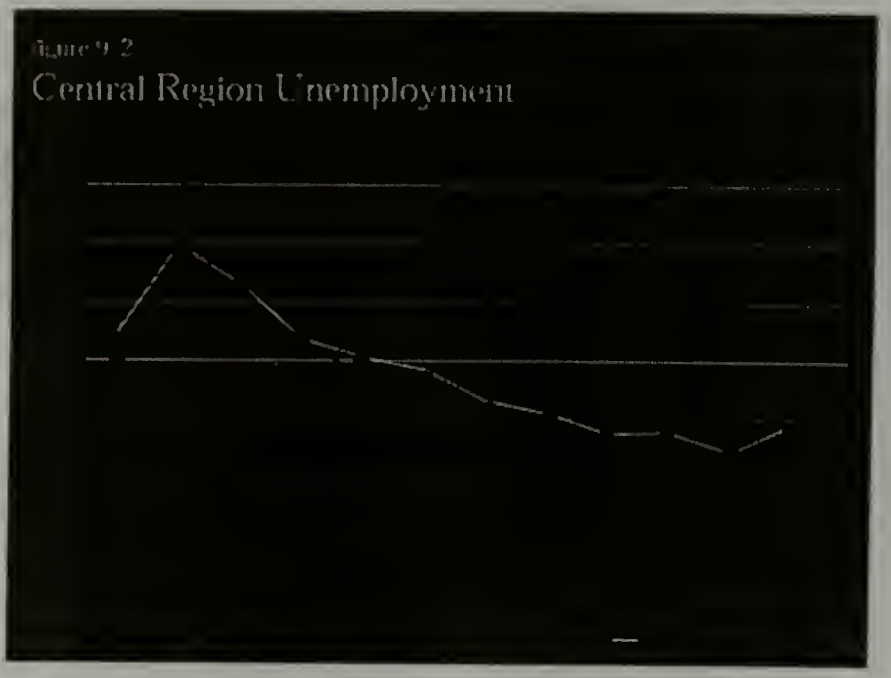
Central Massachusetts enjoyed the same economic boom experienced by the State as a whole over the past decade. In 1991, the worst year of the 1990s recession, unemployment in the Region stood at 9.9 percent, higher than the statewide rate of 9.1 percent. Since then, both the State and the Region have seen joblessness steadily decline. The regional unemployment rate in 2001 was 3.7 percent, a few ticks higher than the statewide rate of 3.4 percent. Joblessness in the North Central sub-region was a bit higher still, at 3.9 percent (see figure 9-2).

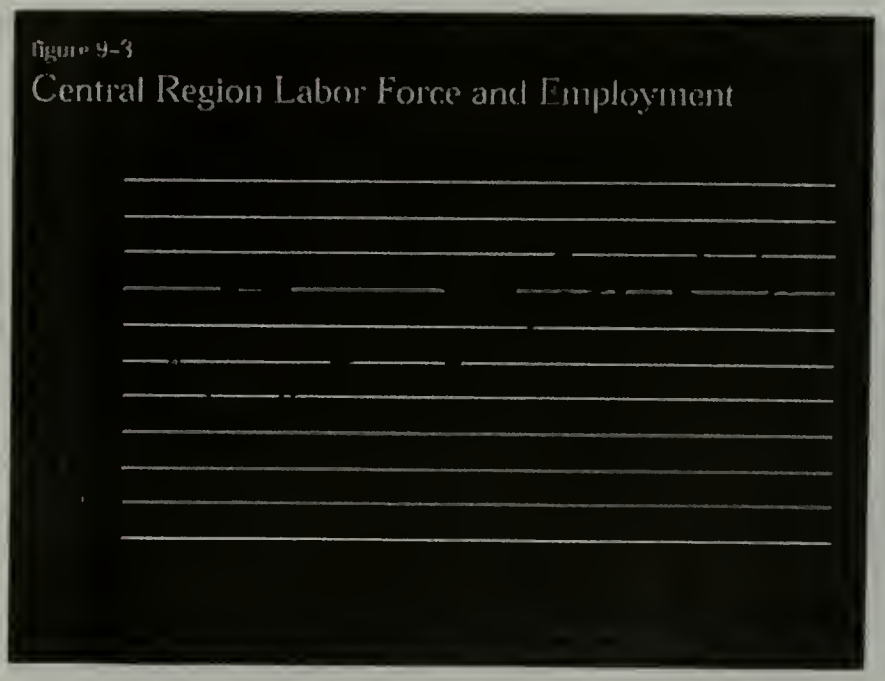
The number of people employed in the Central Region in 1991 – the low point in the Commonwealth's recent history – was 334,000. Ten years later, the number had increased to a high of 372,000, an 11.4 percent gain (see figure 9-3). Data for the North-Central sub-region indicate a similar pace of workforce and employment growth. Employment in the State as a whole rose a bit faster, rising 12.4 percent.

Income

Figure 9-4 (on the following page) shows that average real wages rose at a slower pace than the State as a whole. Wage growth in the North Central sub-region lagged further still.[7] In 1999, the sub-region's average real wage was $30,807, an increase of 4.5 percent over 1990 levels. During the same period, real average wages for the Region increased 10.3 percent, to $33,840. In Massachusetts, real average wages increased 17.4 percent, to $40,127. The Central Region and the North-Central sub-region enjoyed rising real wages during the '90s boom but that growth lagged the rest of the State.







---

[1] North Central Communities include: Ashburnham, Ashby, Ayer, Barre, Berlin, Bolton, Clinton, Fitchburg, Gardner, Groton, Harvard, Hubbardston, Lancaster, Leominster, Lunenburg, Pepperell, Princeton, Shirley, Sterling, Templeton, Townsend, Westminster and Winchendon.

[2] Metro Worcester Communities include: Auburn, Boylston, Brookfield, Charlton, Dudley, East Brookfield, Hardwick, Holden, Leicester, Milford, New Braintree, North Brookfield, Northborough, Oakham, Oxford, Paxton, Rutland, Shrewsbury, Southbridge, Spencer, Sturbridge, Warren, Webster, West Boylston, West Brookfield, Westborough and Worcester.

[3] Blackstone Valley Communities include: Blackstone, Douglas, Grafton, Hopedale, Mendon, Millbury, Millville, Northbridge, Sutton, Upton and Uxbridge.

[4] A detailed sub-Regional economic analysis is only possible for the North-Central sub-Region. Public economic data at the sub-Regional level of analysis are limited. This is primarily due to the need to preserve employer confidentiality and because sub-Regional boundaries recognizable by Central Massachusetts residents do not always correspond to sub-Regional employment data tracked by the Massachusetts Division of Employment and Training.

[5] Ibid.

[6] The data in this section on the number of people employed, in the labor force, and unemployed are taken from the household survey. They therefore will not match the employer-based data used in other sections that report the number of payroll jobs.

[7] The U.S. consumer price index (CPI) was used to adjust nominal wages for the effects of inflation..

figure 9-4
Central Region Average Real Wages

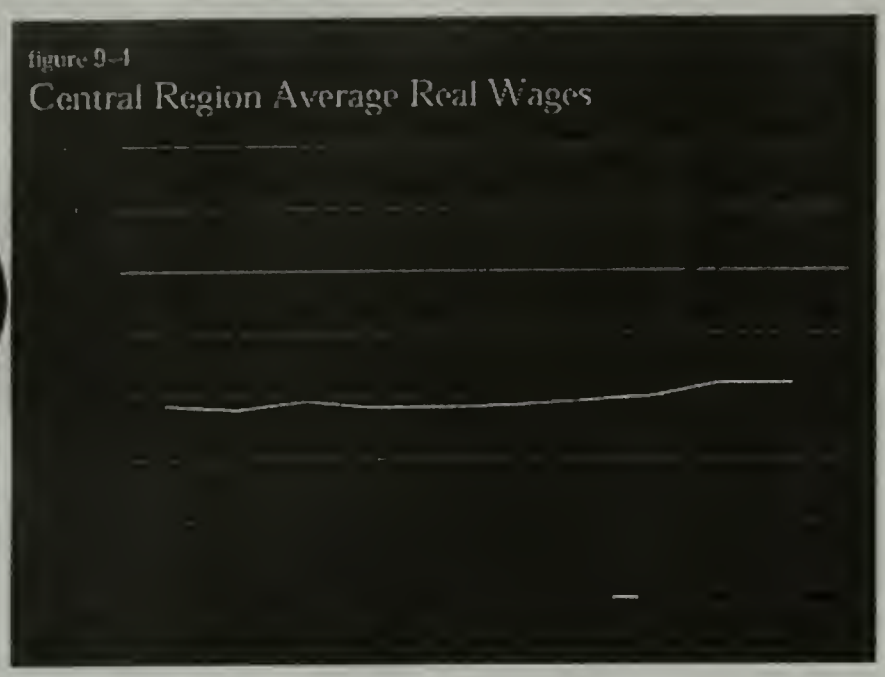


figure 9-5
Central Region Employment by Major Division

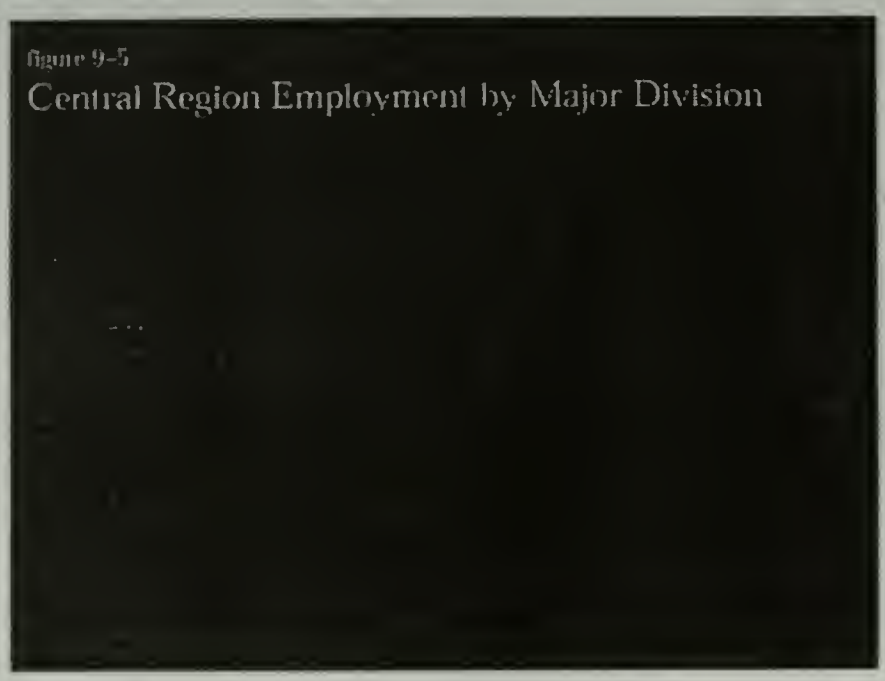
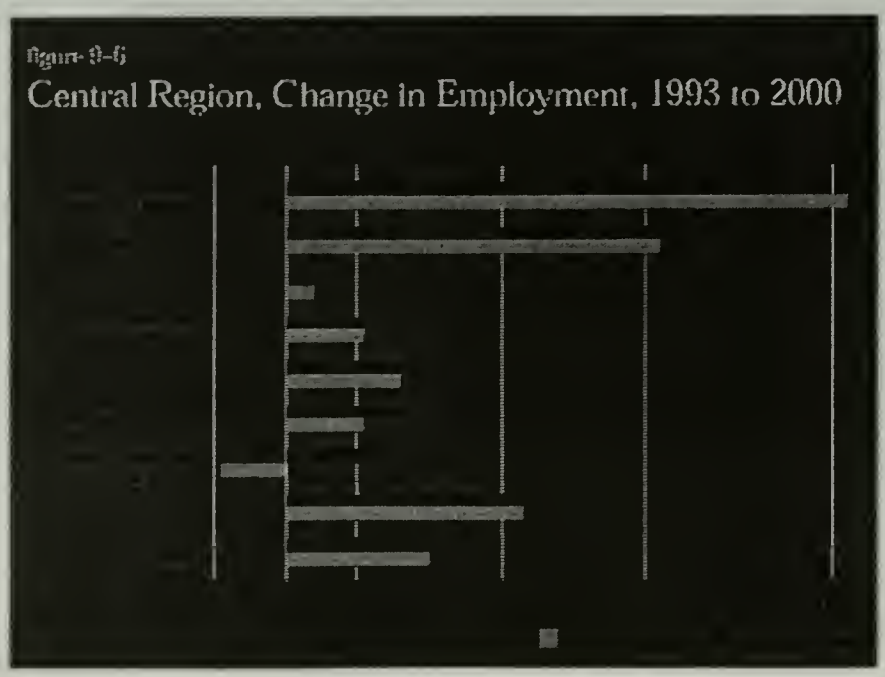


figure 9-6
Central Region, Change in Employment, 1993 to 2000



Employment by Major Industry Sector

While the Central Region gained 38,099 jobs between 1991 and 2001,[8] not every industry sector grew at the same pace. Figures 9-5 and 9-6 provide data on employment shifts by major industry sector between 1993 and 2000. Construction employment grew rapidly in the Region, as in the State, due to an upturn in homebuilding and in the development of commercial sites. Manufacturing, the Region's second-largest sector and at one time its economic foundation, rebounded with a 4 percent gain in employment, even while the sector declined by 2 percent in the State overall. The finance, insurance, and real estate sector actually lost 1,600 jobs, shrinking by 9 percent. Over 60 percent of the Region's net employment gain came in services, and the sector accounted for more than three out of every eight jobs by the year 2000.

Every major industry sector in the Central Region experienced an increase in average real pay between 1993 and 2000. The gains in transportation and public utilities, retail trade, mining, manufacturing, and government actually exceeded the growth rates for those sectors in the State. However, real average wages grew more slowly in several sectors, including construction, transportation and public utilities, wholesale trade, and finance, insurance and real estate (FIRE) (see figure 9-7). The net effect of these different growth trends was slower real average wage growth in the Region than in the State as a whole.

However, two important sectors posted solid wage gains. Manufacturing enjoyed a large increase in average pay, rising 25 percent over the period, from $45,722 to $57,343 (2000 dollars). Though the number of employees in the finance, insurance, and real estate sector dropped, average pay in the sector increased 18 percent, rising from $40,481 to $47,964 (2000 dollars).

The Central Region Export Sector

As explained in Chapter 2, a healthy export sector is critical to a region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's export sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[9] and the more recent *Knowledge Sector Powerhouse.*[10] They include four knowledge-based clusters – Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive: Travel and Tourism, and "Traditional Manufacturing" (manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery, which are not part of the Information Technology or Health Care clusters). The discussion below uses this framework to explore the Central Region's export sector.

Figure 9-8 shows export cluster growth in the Region and sub-region, as compared to Massachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The health care cluster, for example, includes physicians serving the local population. A finer picture of the composition of the Region's export sector, and the extent to which it has become part of the wider knowledge-based economy, is developed in the discussions that follow. Also, note that some of the following charts show no data for some industries in the export clusters. This does not necessarily mean that the industry is absent. Federal rules prohibit access to data that could provide information about individual firms. The lack of industry data could be due to this limitation.

Knowledge Creation

Employment in this cluster rose by over 30 percent between 1993 and 2000, surpassing the increase in the State overall. This large jump in the knowledge creation sector is due largely to growth in higher education, where employment rose by two-thirds. Research and test services also saw employment expand by more than 60 percent. Management, public relations, advertising, and accounting services and engineering and architectural services also had sharp increases in employment, though less so than the Commonwealth (see figure 9-9).

Health Care

Employment in this cluster increased by 9 percent from 1993 to 2000, slightly less than the 10 percent gain statewide. This increase can be attributed to significant growth in health services, which cater primarily to local residents. The Central Region did not experience any discernible increase in the drug and pharmaceutical industry[11] and actually saw a 6 percent contraction in medical instruments manufacturing (see figure 9-10 on next page).

The common wisdom sees the Central Region enjoying continued growth in biotech throughout the 1990s. This is partially true. The number of biotech businesses did increase in number by 37 from 1996 to 2001. Employment, however, fell by nearly 600. The average biotech firm became smaller, with the average number of employees dropping from 44 to 23. Large firms as AstraZeneca in Westborough; Cambridge Biotech Corp. and Neptune Pharmaceuticals in Worcester; and Boston Scientific and Precision Wire, both in Milford, either reduced staff or ceased operations in the Region altogether. The emergence of many small startups did not compensate for these employment losses.

figure 9-7

Central Region, Change in Real Average Pay, 1993 to 2000

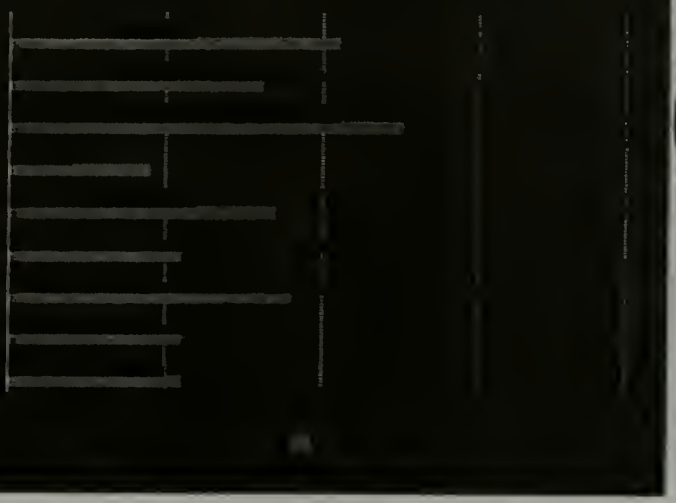


figure 9-8

Employment Change in the Commonwealth's Export-Oriented Clusters: The Central Region, 1993 to 2000

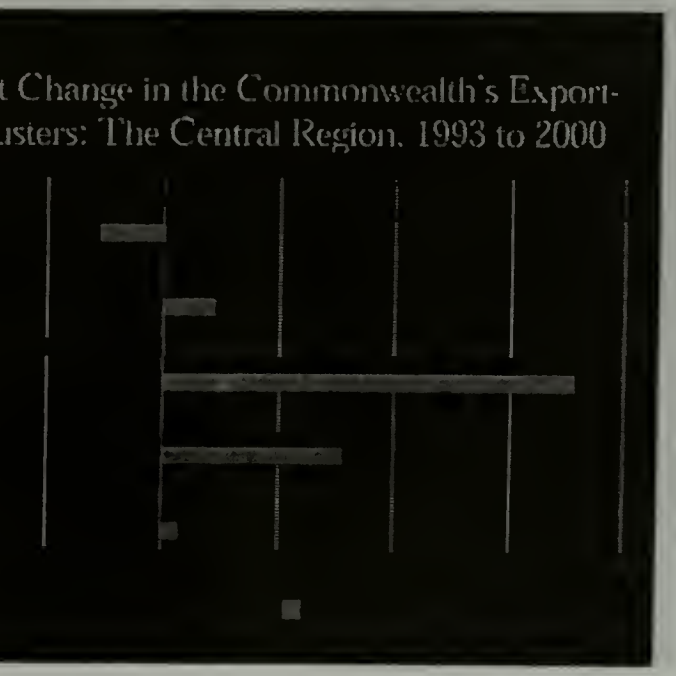
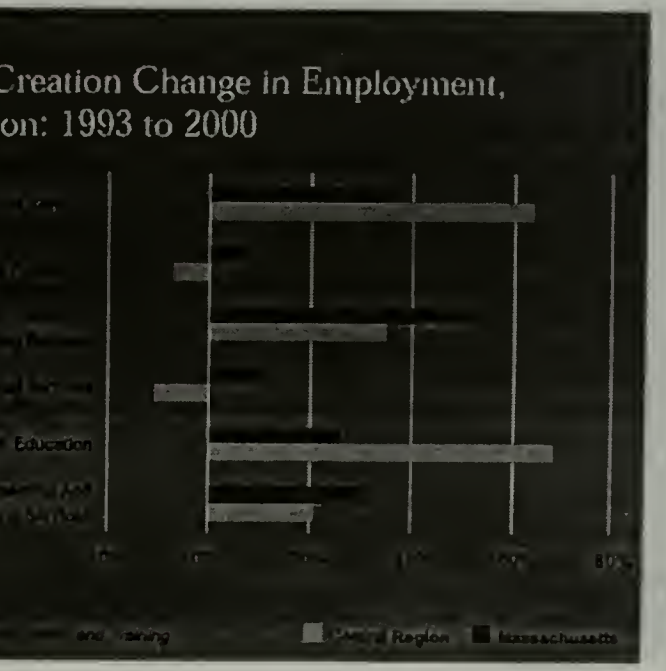
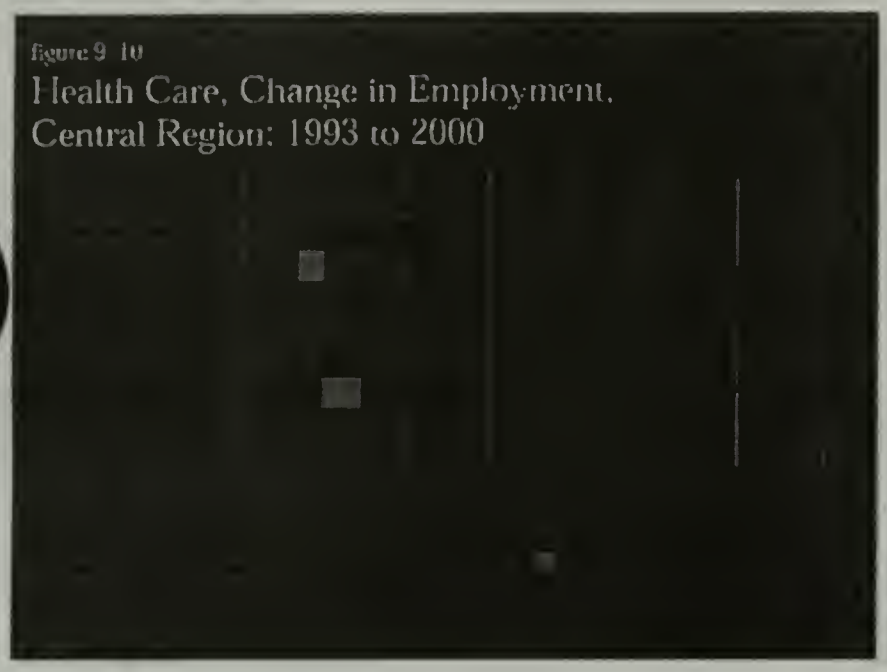


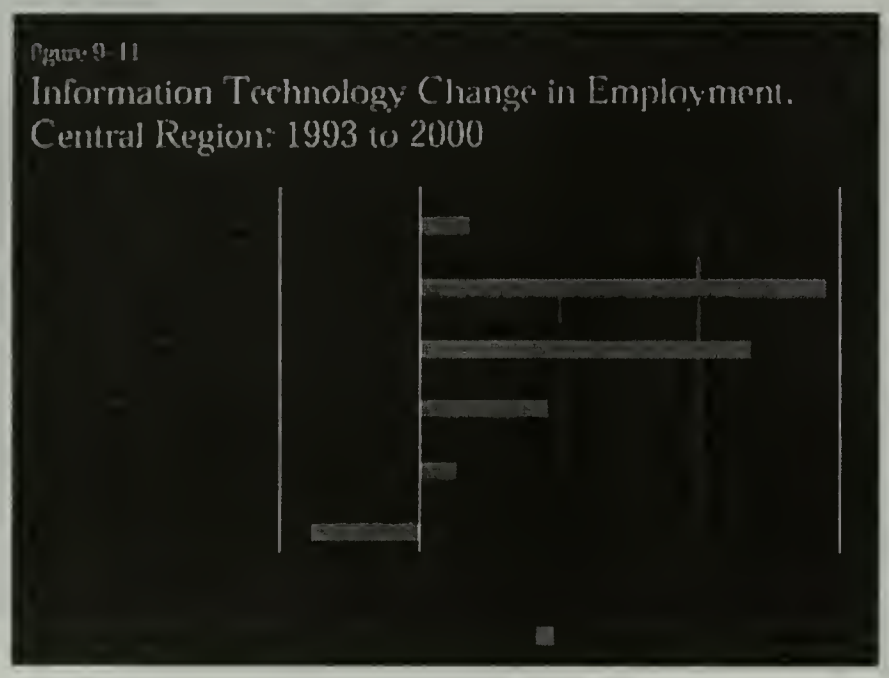
figure 9-9

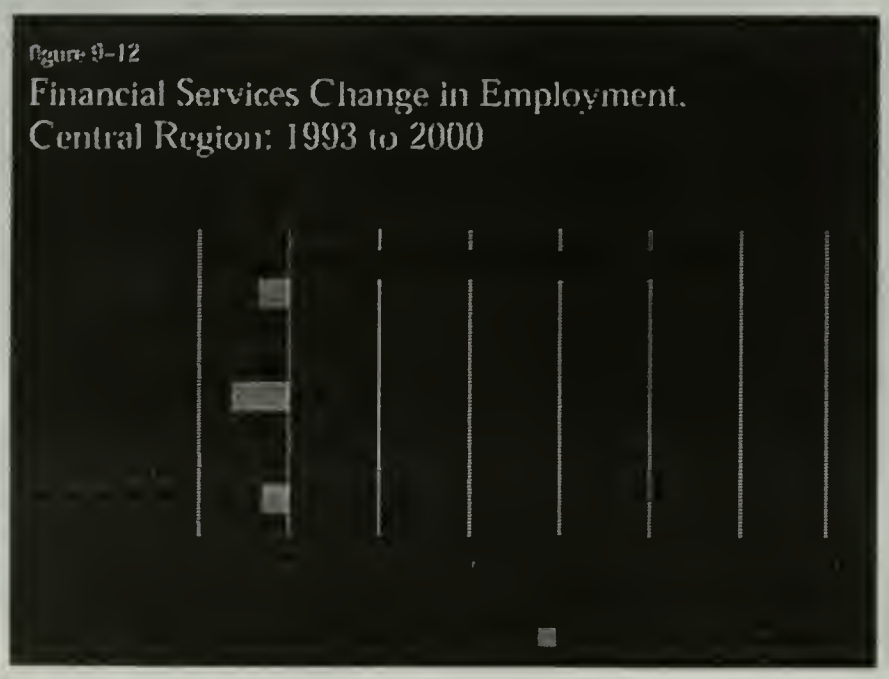
Knowledge Creation Change in Employment, Central Region: 1993 to 2000



[8] Employment is measured here using the Bureau of Labor Statistics, ES-202 series, which are employer reports of payroll jobs rather than household-based measures of employed or unemployed people. As a result, the numbers will differ from employment figures based on the household survey presented in other sections of the document.
[9] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts, (Boston: 1993).
[10] Robert Forrant, Philip Moss, and Chris Tilly, (Boston: UMass Donahue Institute 2001).
[11] The Massachusetts Division of Employment and Training suppressed the data to preserve employer confidentiality.







Information Technology

IT employment in Central Massachusetts soared 71 percent from 1993 to 2000, surpassing the statewide gain of 62 percent. This increase is largely attributable to growth in computer software development and other computer services. Employment in software development nearly tripled, while employment in computer services more than doubled. Both subgroups grew much faster in the Region than in the State as a whole (see figure 9-11).

Financial Services

Employment in financial services fell 11 percent from 1993 to 2000, a significant departure from the Commonwealth's 18 percent gain. This decline is largely due to the layoffs at major insurance carriers in the Worcester area – jobs that tend to be export-oriented. Employment in banking and savings institutions also slipped, most likely the result of bank mergers and the subsequent streamlining of staff and resources. Employment even fell in the securities and exchange services sub-sector, which grew spectacularly in the Commonwealth (see figure 9-12).

Traditional Manufacturing

Employment in this cluster, the heart of the Region's traditional export base, grew just three percent between 1993 and 2000. This exceeded the statewide gain of one percent. Employment in apparel and textiles jumped 15 percent, while falling over 30 percent statewide. Employment in machinery increased by 10 percent, although here the State grew faster. Plastics and rubber manufacturing, a regional specialty, grew more quickly in the North-Central sub-region (4 percent) than in the Region as a whole (2 percent), but slightly below the 5 percent statewide rate. Workers in the North Central sub-region rely on jobs in this cluster to keep pace with real average wages in the region (see figure 9-13).

Travel & Tourism

The growing impact of the Travel and Tourism cluster in the Central Region can be seen in the experience of its hotel industry. In fiscal year 2000, hotels and motels in Worcester County grossed an estimated $100 million in room sales, up 36 percent over fiscal year 1997 levels.[12] These expenditures define a conservative estimate of traveler spending. This is because total spending typically includes meals, retail purchases, and attractions, in addition to spending on accommodations.

Between 1997 and 2000, the number of hotels in the county increased 19 percent, to 64. Employment expanded 15 percent, to 2,077 workers. Pay in the industry is low and frequently offers part-time jobs. Yet average real wages increased 21 percent in this three-year period, to $17,284.

[12] Estimate based on FY00 State room occupancy tax collections, which are levied at 5.7 percent of the room rate.

Demographics

Population

The Region's population growth exceeded the statewide rate in both the 1980s and 1990s. The population in Central Massachusetts jumped 10.1 percent in the 1980s, twice the pace in the Commonwealth, and by 1990 accounted for 12 percent of the statewide total.

Resident Age Distribution

Shifts in the Region's age distribution echo State and national trends. As the leading edge of the baby-boom generation approaches retirement, they have expanded the size of the 45 to 64 age group by nearly one-third from 1990 to 2000. Other significant changes, also seen across the State and nation, are a sharp decline in the 19-24 age group and a nearly 11 percent rise in the population under 18 (see figure 9-14). Given these trends, the retention of the Region's younger residents is essential to ensuring the availability of workers to support future economic growth.

The Central Region's population is approximately 89.7 percent White, 2.8 percent Black, and 2.6 percent Asian. While all groups grew in the 1990s, the number of Black residents increased by over 30 percent, more than twice the 14 percent rise in the State overall. The Asian population also increased dramatically, but the Region's 69 percent increase closely mirrors the State's 66 percent gain. The share of the population that is White has thus declined somewhat since 1990 (see figure 9-14). The Region's Hispanic population also grew rapidly, expanding by more than half. In 1990, Hispanics were 4.6 percent of its population; their share grew to 6.7 percent in 2000.[13]

Housing

About 61 percent of the housing units in the Central Region were owner-occupied in 2000. Thirty-four percent were renter-occupied and the remaining 5 percent were unoccupied, seasonal, recreational, or occasional-use. This represents no significant departure from the 1990 distribution. It is worth noting that the owner-occupied rate remained stable while statewide it dipped from 59.5 percent to 57.5 percent (see figure 9-15 and 9-16 on page 98).

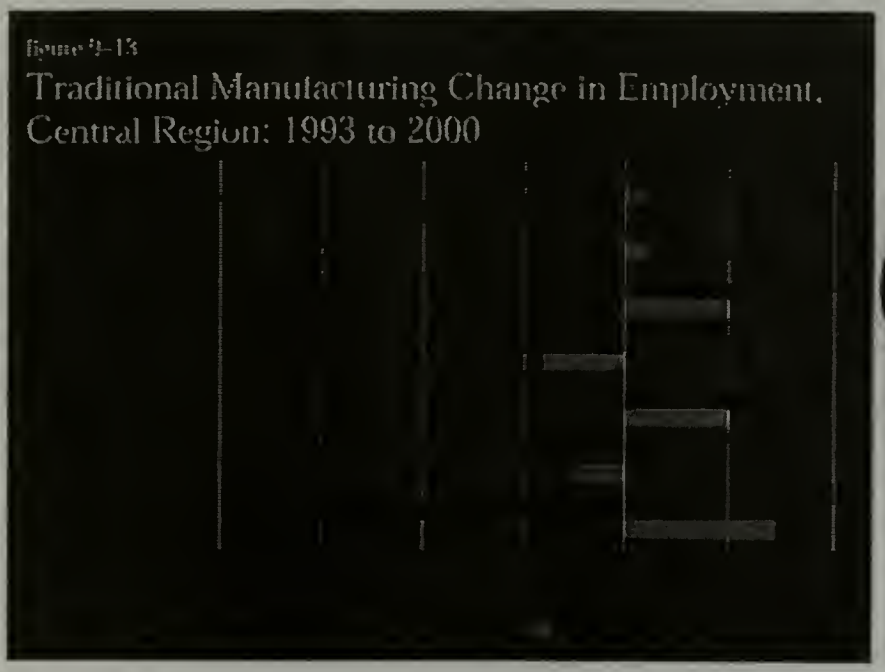
Regional Strengths and Competitive Advantages

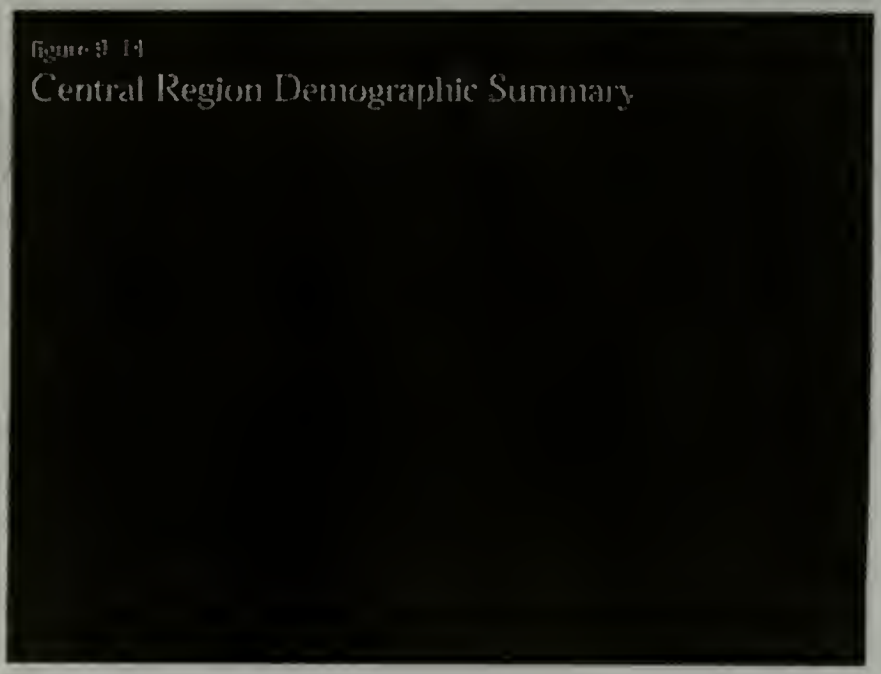
Central Massachusetts is frequently described as the zone of transition, set between the constantly changing economy of Greater Boston to the east and the quiet, steady evolution of Western Massachusetts. The Region indeed has elements that reflect the best of east and west, and which underlie its overall economic performance.

Location. The Region has clear locational advantages in its connections to other parts of the Commonwealth and to gateways to national and global markets. State Route 2 and I-90 (the Massachusetts Turnpike) both provide high-speed access to Boston in the east and to Albany and beyond in the west. I-495 touches the eastern edge of the Region, while Route 146 flows from Providence through the Blackstone Valley. I-190 connects Worcester to Leominster and the edges of Fitchburg. Moreover, I-395 provides quick access to New London. I-84, on the westerly edge, provides quick access to Hartford and beyond. Routes 9, 12 and 122 also provide important inter-regional connections for commuters and commercial users alike. This highway system is joined by freight and commuter rail and easy access to three freight and commercial airports, ensuring that the Region is well connected to both regional and distant markets.

Flexibility. Cities and towns throughout the Region have been actively reaching out to develop new as well as traditional indus-

[13] Data describing race and ethnicity must be used with caution. For more information, see the Part II Introduction.





try clusters. This is most evident in its cities, which have been shifting their economic focus to new, knowledge-based industries and from traditional to more flexible manufacturing techniques. Worcester's efforts to expand its highly successful Biotechnology Park and Leominster's efforts to transform its plastics industry illustrate this trend. The Region's smaller towns have also been active; Milford, Bellingham, Westborough, and Shrewsbury are making themselves centers of knowledge-based industries. Blackstone Valley towns are updating their zoning to attract industry suitable to their character. Southbridge and Sturbridge are modernizing their infrastructures and building on the local expansion of the defense sector to stimulate growth.

Labor force. The Region's skilled workforce has been a strong asset. Its blue-collar workers are highly skilled in precision tooling, mold making, fiber optics, and other manufacturing trades. These workers, coupled with the presence of the region's 14 major institutions of higher education, make Central Massachusetts an optimal location for firms that combine research and development with precision production. The Region's workforce has the necessary skills in many trades and occupations and can serve a wide variety of industries. Companies relocating to the Region can expect to draw from a rich pool of educated and well-trained workers. They also have the support networks and just-in-time resources required for seamless operation.

Cost of living. The Region's assets are further enhanced by the quality of life and by housing prices that remain well below those found in Greater Boston. Central Massachusetts has a wide variety of housing, ranging from rentals and older units to modern tract housing. The critical balance between wages and housing costs is also far more favorable here it is than further east.

The Central Region is no longer the Commonwealth's center of traditional manufacturing. Transportation connections, especially along Rt.146 and the Massachusetts Turnpike, have opened new opportunities. Knowledge-based industries, shifting westward from Greater Boston, have increasingly found good locations in the region, spawning edge cities such as Westborough and Milford. The Region's high quality of life and low cost of living are increasingly appealing. These factors, critical to its success in the 1990s, should make Central Massachusetts an attractive place to live and work for years to come.

Challenges to Future Growth

The Central Region is still in flux. As furniture and other traditional manufacturing firms have declined over the past decade, new industries have been launched. On one hand, this turbulence is positive. Modern jobs have increasingly replaced those that no longer make economic sense. This turbulence, however, also creates significant challenges to the region's long-term prosperity.

Unskilled workers. The Region's movement toward a more modern economy has meant that workers with minimal skills are being left behind. The region is also attracting new immigrants with little education and the need for language training. There is a danger of a widening gap in the Central Region: the skilled, educated, and relatively prosperous on one side and the unskilled and uneducated on the other. This skills problem will become more important as three other factors come into play. First, its population is aging, experienced workers are reluctant to change jobs to pursue new opportunities. Second, the Region experienced a dramatic decline in the number of 19- to 24-year-olds who are joining the workforce at the entry level. Finally, the current unemployment rate of about 4 percent, in the midst of a recession, means there are not many workers available for employment. The Region is hard-pressed to meet the labor needs of its employers, and the situation will likely worsen when the recession ends. In short, the region needs to ensure that all its citizens are prepared to meet the workplace opportunities of the future.

Unbalanced growth. Communities on the eastern edge of the Region are becoming increasingly prosperous as they embrace new growth industries. Worcester, Leominster, the Devens District and the Blackstone Valley are also well positioned for growth. However, several Central Region communities, such as Winchendon, Westminster, Templeton, and Athol, have shown little economic advancement. The Center for Advanced Fiberoptic Applications and the Department of Defense Center both hold great potential for in the Southbridge-Sturbridge area, yet more real economic progress has been slow.

Unbalanced growth could lead communities to and to court firms that offer short-term advantages rather than a more promising economic future. For example, mall developers and warehouse owners are eager to find sites along the new intersection of the Massachusetts Turnpike and Rt. 146. For communities hungry for jobs and tax-base expansion, it can be tempting to take the first offer. Given the statewide shortage of industrial land, this might not be the best approach to development in Central Massachusetts.

The Region must also address the indirect impacts of rapid economic development. Devens has grown, EMC expanded, and Cisco Systems has begun construction of its nearby Boxboro campus. This has brought to the region many skilled, high-paid workers, who have increased demand for nice homes, good schools, and a high quality of life. This expansion of knowledge-based ventures brings economic benefits, but also generates costs. It has driven up housing costs and has displaced poorer populations. There is a need to expand the supply of housing in Central Massachusetts for residents in all income ranges. But some communities are limited by regulations and others lack land or infrastructure.

Lack of unification. Towns in the Central Region are organized into a many different planning bodies: the Central Massachusetts Regional Planning Commission, the Metropolitan Area Planning Commission, the Devens Commission, the Montachusett Regional Planning Commission, and even the Franklin County Regional Planning Commission. The Region also has many strong Chambers of Commerce and an active I-495 Initiative Group. Coordinating these various groups has proven challenging. Until such organizations can identify their common interests and pool their resources, it will be difficult to maximize regional planning solutions.

Regional Policy Priorities

Workforce training. The Region must improve relationships among local colleges, community organizations, business groups, and workforce investment boards to better apply its resources to workforce training challenges. These agencies should be held closely accountable for their ability to raise worker skills.

Economic Development Planning. Regional planning agencies, Chambers of Commerce and municipal economic development officials need to work together more effectively. Improved collaboration will be necessary if the Region is to develop a common vision for its future.

Transportation. It is important to complete the Rt. 146 connector to I-290, expand commuter rail service to meet growing demand, address mass transit needs along the eastern edge of the Region, and complete the Fitchburg-Route 2 connector. While Worcester 's regional airport has made substantial progress in recent years, attracting new carriers and destinations is still needed.

Affordable housing. This is increasingly a critical challenge in all areas of Central Massachusetts. This is becoming particularly problematic in eastern half of Worcester County and in the metro Worcester area which, in recent years, has become more attractive to families seeking alternatives to higher housing costs in Greater Boston.

Brownfields revitalization. This Region has extensive brownfields. Redevelopment can help protect community character, improve the environment, and bring these sites back to active economic use.

Linking the Region's Policy Priorities to Potential Solutions

Part 3 provides a variety of policy options that can help address the Region's economic development needs. Figure 9-17 shows where to find relevant options.

figure 9-15
Central Region Housing Supply

figure 9-16
Central Region Home Ownership

figure 9-17
Central Region Policy Options for Regional Properties

pioneer valley region





The Pioneer Valley – defined by the Connecticut River valley – runs north-to-south from Canada, then along the Vermont-New Hampshire border, through three western Massachusetts counties stacked north to south: Franklin, Hampshire, and Hamden,[1] then to the sea through central Connecticut. The Valley is in many ways a cohesive economic unit, with a long history of precision metalworking and expertise in insurance. These industries still form the backbone of the Valley's export base.

In Massachusetts, the Springfield metropolitan area is the economic center of the Pioneer Valley Region. The city sits at the crossroads of the Massachusetts Turnpike, which runs east-to-west, and Interstate 91, which runs north-to-south down the Valley from Canada to the sea. The Region's economy still flows primarily north and south. It has relatively few business-to-business dealings even with its immediate neighbors to the east and west.

Springfield itself is located along the Connecticut border, close to Hartford and the large complex of economic activity to the south. Springfield's numerous small machine shops supply large, high-tech manufacturing firms located throughout the Valley that make jet engines, aerospace components, military equipment, and other high-value products. The Massachusetts Mutual Life Insurance Company (MassMutual), headquartered in Springfield, is part of an insurance cluster that includes well-known carriers located in Hartford. These industries serve national and international markets using a well-developed road and rail transportation network and Bradley International Airport in northern Connecticut. Along with its many colleges, its university and two significant medical centers, the Region boasts one of the largest retail malls and the biggest amusement park in New England. With a mix of city, small town, and rural communities and a low cost of living, the Pioneer Valley also provides an attractive quality-of-life to its residents.

The 1990s was a difficult decade, however, as the Pioneer Valley found itself in the midst of a long-term economic transition. The Region was hit hard by: 1) the recession of the early 1990s; 2) the defense industry restructuring that followed the end of the Cold War; and 3) a prolonged slump in the insurance industry. Many of its manufacturing and financial services industries actually have good prospects for growth in national and global markets in the 21st century. The task at hand is both to diversify the Region's export base away from its traditional industrial-revolution roots and to re-orient its traditional clusters toward a more competitive structure that can thrive in the new century.

There are signs that this re-orientation is already underway. While employment remains below levels seen at the end of the 1980s, the job count has increased steadily since the middle of the decade. We find supporting evidence among "old-line" manufac-

[1] The Pioneer Valley Region also includes four towns in northwest Worcester County: Athol, Petersham, Phillipston, and Royalston.

[2] *New England's Knowledge Corridor: The Making of an InterState Region.* Connecticut Center for Economic Analysis, Connecticut Economic Resource Center, and the UMass Donahue Institute, 2002.

turing industries – often viewed euphemistically as "mature" – of a transformation toward a high-tech ways of doing business. Recent research conducted for the Hartford-Springfield Economic Partnership demonstrates that a four county region, including Hampden and Hampshire counties, has become one of the most productive in the nation.[2] This suggests that Pioneer Valley firms, across a broad spectrum of industries, are replacing traditional approaches with better, often high-tech ways of doing business.

Sub-Regional Analysis

The Pioneer Valley stretches from the City of Springfield in Hampden County[3] through the more rural Hampshire County,[4] and into Franklin County,[5] which is rural, hilly, and more agricultural, but with a significant manufacturing base. This report defines Franklin County as a sub-region for detailed analysis.

Because of the way economic information is collected and recorded, detailed data at the sub-region level is often only available for Franklin County. When available, this data will be presented in the charts and figures that follow.

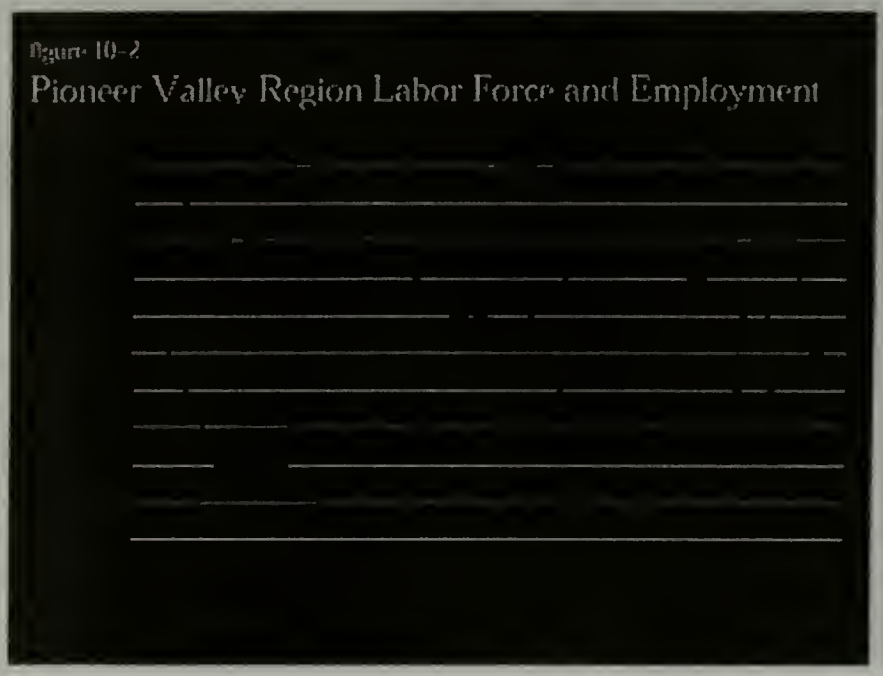
Economic Overview

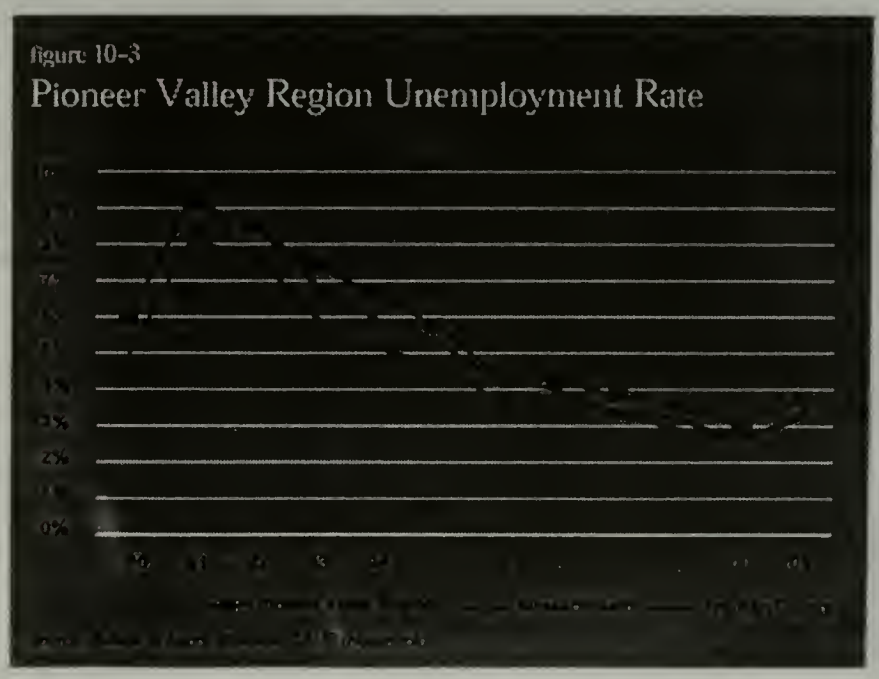
Employment

Employment in the Pioneer Valley Region posted its highest-ever level – just under 335,000 workers – at the peak[6] of the previous expansion in 1989 (Figure 10-2). Not surprisingly, the regional unemployment rate was also quite low at 3.9 percent, one-tenth of a point better than the statewide rate. But economic conditions then deteriorated rapidly. Employment fell more than 7 percent, to 310,050 by 1992, and joblessness hit 9.5 percent. Employment in the Commonwealth fell by 200,000 between 1989 and 1991, a 6.4 percent decline, and unemployment peaked at 9.1 percent (Figure 10-3).

The Region's unemployment rate fell steadily, to 3 percent in the year 2000. The Commonwealth's jobless rate that year reached 2.6 percent. While falling unemployment was certainly good news, the major factor was not a rise in employment but out-migration and a decline in the Region's workforce – an ongoing


figure 10-1
Pioneer Valley Employment by Major Industry and County, 1999


figure 10-2
Pioneer Valley Region Labor Force and Employment


figure 10-3
Pioneer Valley Region Unemployment Rate

[3] Hampden County comprises: Agawam, Blandford, Brimfield, Chester, Chicopee, East Longmeadow, Granville, Hampden, Holland, Holyoke, Longmeadow, Ludlow, Monson, Montgomery, Palmer, Russell, Southwick, Springfield, Tolland, Wales, West Springfield, Westfield, and Wilbraham.

[4] Hampshire County comprises: Amherst, Belchertown, Chesterfield, Cummington, Easthampton, Goshen, Granby, Hadley, Hatfield, Huntington, Middlefield, Northampton, Pelham, Plainfield, South Hadley, Southampton, Ware, Westhampton, Williamsburg, and Worthington.

[5] Franklin County comprises: Ashfield, Bernardston, Buckland, Charlemont, Colrain, Conway, Deerfield, Erving, Gill, Greenfield, Hawley, Heath, Leverett, Leyden, Monroe, Montague, New Salem, Northfield, Orange, Rowe, Shelburne, Shutesbury, Sunderland, Warwick, Wendell, and Whately.

[6] The data in this section on the number of people employed, in the labor force, and unemployed are taken from the household survey. They therefore will not match the employer-based data used in other sections that report the number of payroll jobs.

Figure 10-4
Pioneer Valley Region Average Real Wages



Figure 10-5
Change in Real Average Pay by Major Industry, Pioneer Valley Region: 1993 to 2000

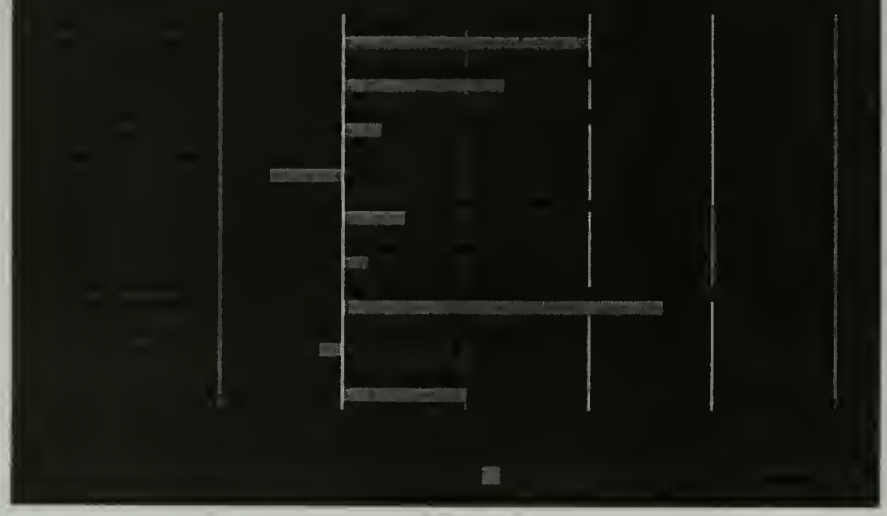
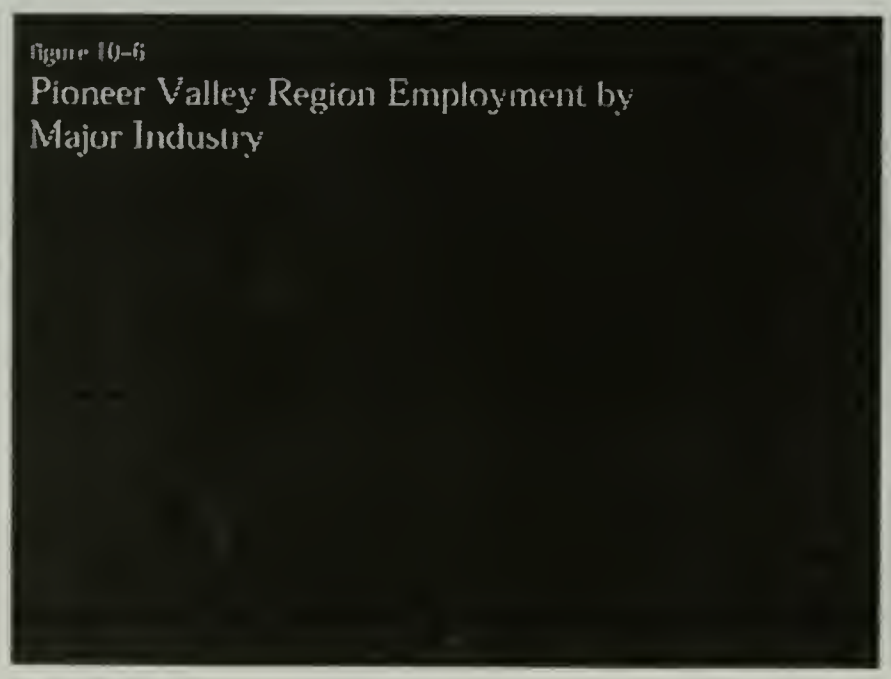


Figure 10-6
Pioneer Valley Region Employment by Major Industry



phenomenon in the Pioneer Valley through much of the decade. Employment has grown steadily since 1992, and is now approaching levels seen in the late 1980s. There has been virtually no growth in the Region's labor force, however, and its level was slightly less in 2001 than in 1992 (see figure 10-2 on previous page).

Income

Average real wages[7] in the Pioneer Valley grew modestly during the 1990s, rising over the decade from $28,600 to $29,800 (2000 dollars). In Franklin County, real wages virtually stagnated. They averaged $25,861 in 1990 and $26,500 in 2000. By contrast, average real wages in the Commonwealth went from $34,200 to $40,100 over the decade[8] (see figure 10-4). The Region's modest growth in pay, relative to the rest of the State, is seen in all sectors of the economy other than government (see figure 10-5).

Employment[9] by Major Industry Sector

At the major-industry level of detail, the Pioneer Valley's economy in the year 2000 closely resembles that of the State: Services is the largest sector, at 40 percent of total employment; Wholesale and retail trade account for about 24 percent of total employment. In fact, these three divisions account for nearly two out of three jobs in the Region. Manufacturing, which in so many ways defines the heritage of the Pioneer Valley, represents 16 percent of all employment. Overall, employment growth over the expansion running from 1993 to 2000 exceeded 15 percent; the number of manufacturing jobs, by contrast, grew less than 1 percent (see figure 10-6).

A notable change in industry mix is the growing prominence of manufacturing employment in Franklin County. While the fraction of manufacturing jobs in the Region as a whole declined over the past decade, in Franklin County the division's share of employment went from 23 percent in 1993 to 25 percent in 2000. While mills and farms are commonly seen as mutually exclusive, the proportion of agricultural employment in the County, albeit small, is double what it is in the rest of the Region (2 percent of employment in Franklin County versus 1 percent in the Pioneer Valley Region as a whole). In addition, Franklin County has seen notable growth in knowledge-sector industries, especially information technology, financial services, and knowledge creation (see figure 10-7).

---

[7] The U.S. consumer price index (CPI) was used to adjust nominal wages for the effects of inflation.

[8] The Greater Boston area, where the cost of living is considerably higher than in the Pioneer Valley, dominates these Statewide data. Any wage or income comparisons made between the Region and the State must be made with the cost-of-living differential in mind.

[9] Employment is measured here using the Bureau of Labor Statistics, ES-202 series, which are employer reports of payroll jobs rather than household-based measures of employed or unemployed people. As a result, the numbers will differ from employment figures based on the household survey presented in other sections of the document.

The Pioneer Valley Region Export Sector

As explained in Chapter 2, a healthy export sector is critical to a Region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's export sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[10] and the more recent *Knowledge Sector Powerhouse*.[11] They include four knowledge-based clusters – Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive: Travel and Tourism and "Traditional Manufacturing" (manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery, which are not part of the Information Technology or Health Care clusters). The discussion below uses this framework to explore the Pioneer Valley Region's export sector.

Figure 10-7
Change in Employment, by Major Industry, Pioneer Valley Region: 1993 to 2000

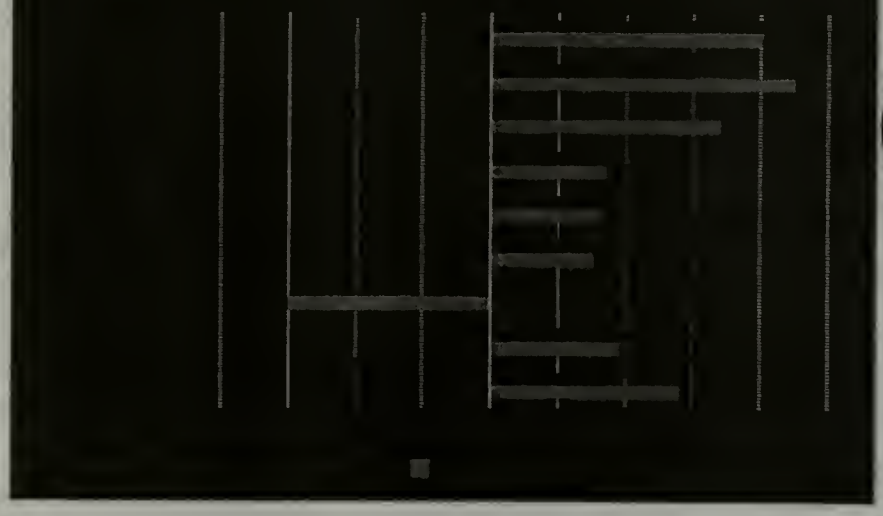


Figure 10-8 shows export cluster growth in the Region and sub-region, as compared to Massachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The Health Care cluster, for example, includes physicians serving the local population. A finer picture of the composition of the Region's export sector, and the extent to which it has become part of the wider knowledge-based economy, is developed in the discussions that follow. Also, note that some of the following charts show no data for some industries in the export clusters. This does not necessarily mean that the industry is absent in the Region. Federal rules prohibit access to data that could provide information about individual firms. The lack of industry data could be due to this limitation.

Figure 10-8
Employment Change in the Commonwealth's Export Clusters: The Pioneer Valley Region, 1993 to 2000

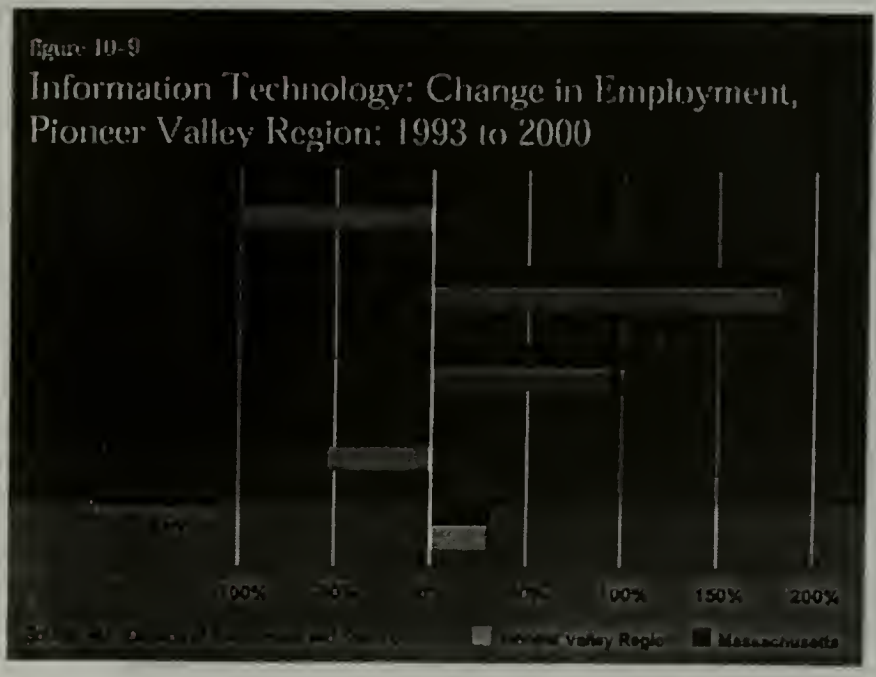


With the exception of Health Care, employment in the export clusters has grown more rapidly in Franklin County than in the Pioneer Valley Region overall. This should place the sub-region in a relatively strong position to take advantage of the next economic expansion.

Information Technology

In the fast-growing Information Technology cluster, employment expanded briskly in software and services and fell sharply in the electronic and electrical equipment manufacturing sector[12] (see figure 10-9).

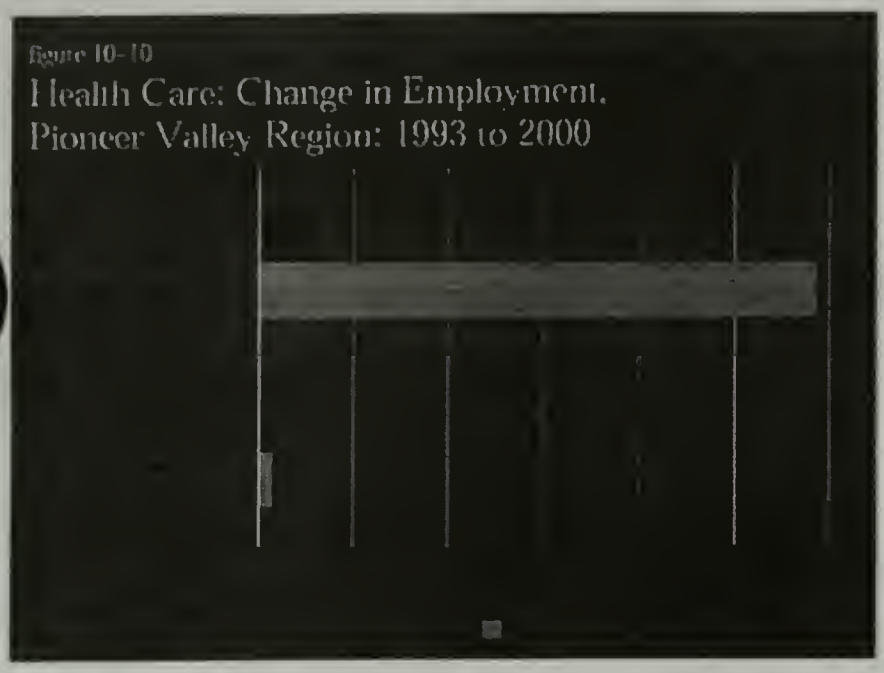
Figure 10-9
Information Technology: Change in Employment, Pioneer Valley Region: 1993 to 2000

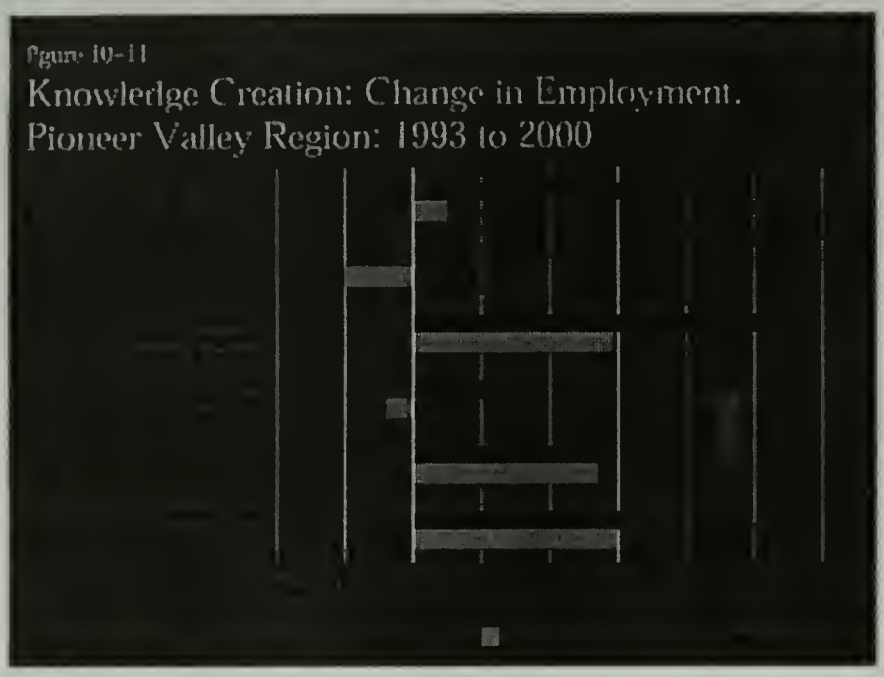


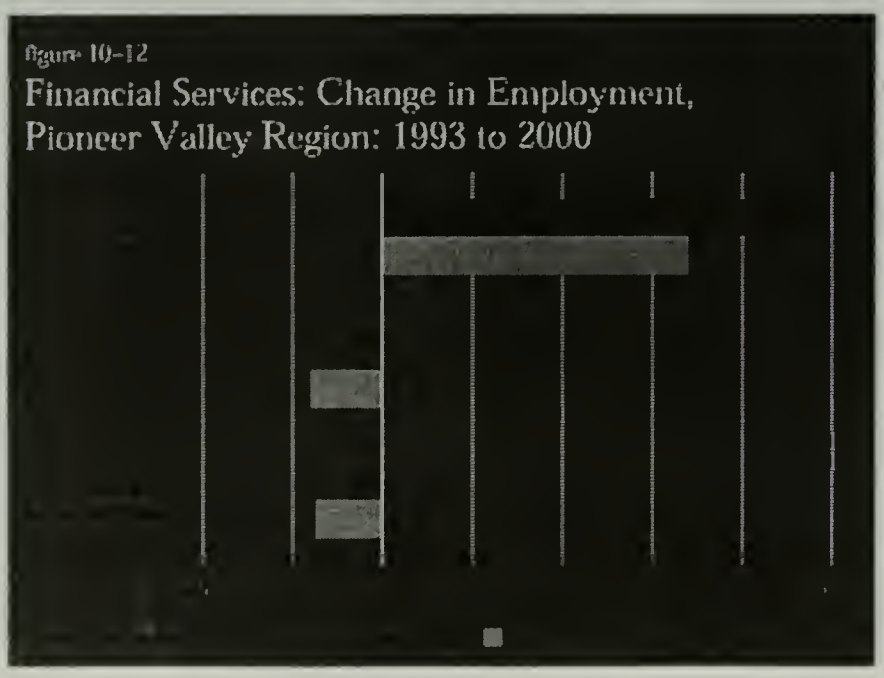
[10] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts. (Boston, 1993).

[11] Robert Forrant, Philip Moss, and Chris Tilly. (Boston: UMass Donahue Institute, 2001).

[12] The Massachusetts Division of Employment and Training suppressed data for the Communications Hardware Manufacturing sub-sector to preserve employer confidentiality.







Health Care

Employment in medical instruments manufacturing nearly tripled, albeit from a small employment base, during the 1993 - 2000 expansion. No other component in this cluster experienced any significant growth during the period[13] (see figure 10-10).

Knowledge Creation

Three components of this cluster have grown at about the same brisk pace since 1993: management, public relations, advertising, and accounting services; higher education; and engineering and architectural services. Only higher education, however, matched the gains registered by the Commonwealth overall. Printing, publishing, and legal services firms shed employees during this same period (see figure 10-11).

Financial Services

The employment decline in this cluster masks a significant shift in the industry mix in regional financial services. While both insurance carriers and banking and savings institutions lost employment since 1993, the number of jobs in securities and exchange services increased by nearly 70 percent (Figure 10-12).

Traditional Manufacturing

Employment in plastics and paper manufacturing, and especially in machinery, advanced during the expansion following 1993. But employment in metalworking, long a staple of Pioneer Valley manufacturing, declined along with employment in apparel and textiles[14] (see figure 10-13 on opposite page).

Travel and Tourism

The growing impact of the Travel and Tourism cluster in the Pioneer Valley Region can be seen in the experience of its hotel industry. In the year ending June 2000, hotels and motels in Hampden, Hampshire, and Franklin Counties grossed an estimated $64.7 million in room sales, up 33 percent over the year ending June 1997.[15] These expenditures define a conservative estimate of traveler spending in the Region. This is because total spending typically includes meals, retail purchases, and attractions, in addition to spending on accommodations.

In 2000, the Pioneer Valley hosted 72 hotels that, on average, employed 26 workers. Pay in the industry is low and frequently offers mostly part-time jobs. Average real wages increased and reached $15,810 during that year.

---

[13] The Massachusetts Division of Employment and Training suppressed data for the drugs and pharmaceuticals sub-sector to preserve employer confidentiality.

[14] The Massachusetts Division of Employment and Training suppressed 1993 data for the Instruments sub-sector to preserve employer confidentiality.

[15] Estimate based on FY 2000 State room occupancy tax collections, which are levied at 5.7 percent of the room rate.

Demographics

Population

In the ten years between the last two decennial censuses, the Pioneer Valley Region saw its population grow 1 percent. During the same period, the number of people in the Commonwealth increased by more than 5 percent (see figure 10-14).

Resident Age Distribution

The Pioneer Valley has seen a noteworthy shift in its age distribution over the past ten years. Most significant has been the drop in both the proportion and the number of individuals between 25 and 44 years old (see figure 10-14). The decline in numbers is due in part to out-migration, as the Region has historically experienced significant out-migration in this age group. Aging has also reduced the proportion of individuals between 25 and 44: the Pioneer Valley saw an increase of more than 30,000 individuals in the group between 45 and 64 years old. The median age of the population also increased from 33.1 to 36.2 years.

The Region's population has remained predominantly White, though there have been some dramatic changes at the margins. Although the White population actually fell 4.3 percent in the ten years between censuses, in 2000 it still accounted for over 85 percent of the population. The small increase in the overall population was due to a growing number of Black residents and Asians. The Black population increased by 8.7 percent, while the Asian population jumped by approximately one third. It should be noted that Asians represent only a small portion of the Region's population and despite their rapid growth during the 1990s, the Asian population remains small in absolute terms (see figure 10-14).

Perhaps the most dramatic demographic change in the 1990s was the growth of the Hispanic population. Those identifying themselves as Hispanic went from 50,630 in 1990 to 76,090 in 2000, a gain of over 50 percent. "Hispanic" is a self-identified designation and such an increase might be due in part to heightened awareness rather than a growth in magnitude. Nevertheless, self-identified Hispanics now account for 11 percent of the people living in the Pioneer Valley.

Finally, Franklin County's total population increased by more than 2 percent during the 1990s, double the rate of the Pioneer Valley as a whole. As of 2001, Franklin County accounted for more than 11 percent of the Region's employment and workforce. While the last recession hit the county hard, job growth here started earlier and went on virtually uninterrupted throughout the 1990s.

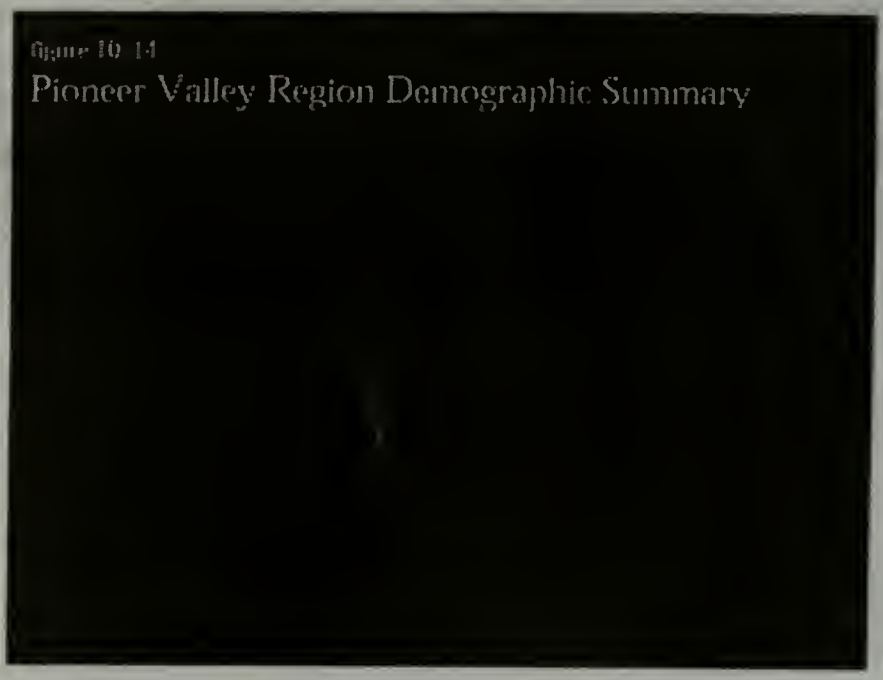
Figure 10-13

Traditional Manufacturing: Change in Employment, Pioneer Valley Region: 1993 to 2000

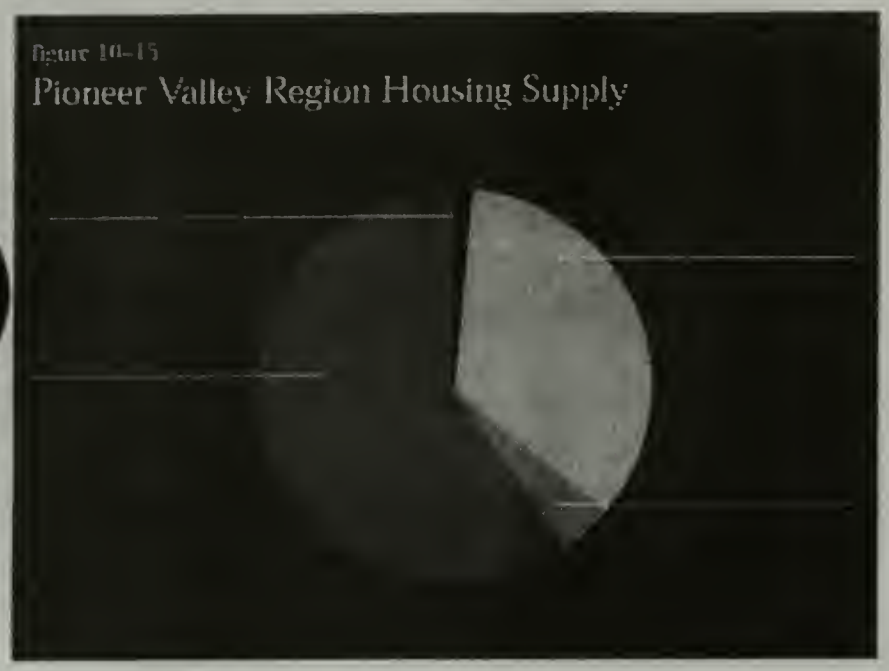


Figure 10-14

Pioneer Valley Region Demographic Summary



[16] Data describing change in race/ethnic mix must be used with caution. For more information, see the Part II Introduction.





Housing

Home ownership and housing affordability are among the key social issues in any region. In the Pioneer Valley, 59.7 percent of all housing units are owner-occupied – a percentage slightly higher than the 57.5 percent rate for Commonwealth as a whole (see figures 10-15 and 10-16).

A causal factor in owner-occupancy is the cost of housing. In the year 2000, the average selling price for a home in the Pioneer Valley was $106,000. This contrasts with the State's average selling price of $205,000. Although the regional figure represents an increase of 23 percent since 1996, the 2000 average selling price for the State is 48 percent higher than it was in 1996.

Regional Strengths and Competitive Advantages

The Region has many positive attributes that make it appealing to a broad range of inhabitants, and the characteristics that appeal to residents also appeal to businesses. An educated workforce, a well-developed transportation network, a high-tech telecommunications network, a broad range of educational opportunities, cultural breadth, relative affordability, and an overall small-town flavor all contribute to the valley's appeal and, therefore, its economic potential.

Location. Just two hours from Boston and three hours from New York City, the Region serves as a centrally located and relatively low-cost alternative for firms. Workers, particularly those with young families, appreciate the benefits of living rurally while having the advantages of city life only a short distance away. The proximity of many institutions of higher education–from the University of Massachusetts to an impressive set of private institutions–enhances the cultural amenities of the region.

The Region is criss-crossed by two major interstate highways, I-91 running north and south, and the Massachusetts Turnpike going east and west. Traveling the interstate highway system puts most of the vast population of the northeastern United States within one days drive of the Pioneer Valley. Bradley International Airport, just south of the Massachusetts State boundary along I-91, is a dynamic and growing resource of airline transportation.

Travel and Tourism. Local officials are pushing a number of projects related to the tourism industry. These include a renovation of the Springfield Civic Center, a new convention center, and a $103 million expansion of the Basketball Hall of Fame. Seasonally, the Region has unique natural attractions that draw tourists, including the fall foliage and the winter skiing season. It is also home to Yankee Candle and the Six Flags amusement park, which draw considerable tourist traffic to the Region.

Regional Economic Development. The Pioneer Valley has successfully organized collaborative regional economic development initiatives. The efforts encompass regional planning, marketing, business attraction and retention and industry-cluster development. These regional economic development partnerships have consistently involved private and public sector groups including local colleges and universities. While these collaborative economic development efforts can make markets work more efficiently – largely by providing information to key players and by seeking out and securing government subsidy for specific efforts – market forces will ultimately determine the economic future of the Region.

Challenges to Future Growth

The primary challenge to the Pioneer Valley is to diversify its economic base to provide multiple sources of future economic growth. The Region's manufacturing sector, while highly productive, cannot be the primary employment growth engine in the future. It remains to be seen what industry – or set of industries – will emerge to drive future economic development.

Regional Policy Priorities

Transportation. There are a number of urgent transportation infrastructure projects that remain unaddressed. Many of the Region's bridges, even those along the interstate system, need repair. Bradley International Airport also needs to be more fully integrated into the Region's transportation network.

Workforce training. Several barriers prevent the Region from taking advantage of current workforce training programs, including a lack of awareness and insufficient access to funding. The Region's past reliance on manufacturing employment, and the skills that support that employment, is not adequate for a high-technology industrial future. As its economic base diversifies, continually upgrading the skills of the workforce will become increasingly important.

Affordable housing. While housing costs have remained low when compared to other regions of the Commonwealth, home prices have been increasing significantly faster than wages. If this trend continues, one of the Region's key competitive advantages – its low cost of living – will erode.

Brownfield revitalization. One of the hidden constraints to economic development in the Region is the availability of land for industrial use. The Pioneer Valley has extensive brownfields that, if redeveloped, could help to alleviate this shortage. Redeveloping these contaminated land sites would also help preserve community character and improve the environment.

Linking the Region's Policy Priorities to Potential Solutions

Part III provides a variety of policy options that can help address the Region's economic development priorities. Figure 10-7 shows where to find relevant options.

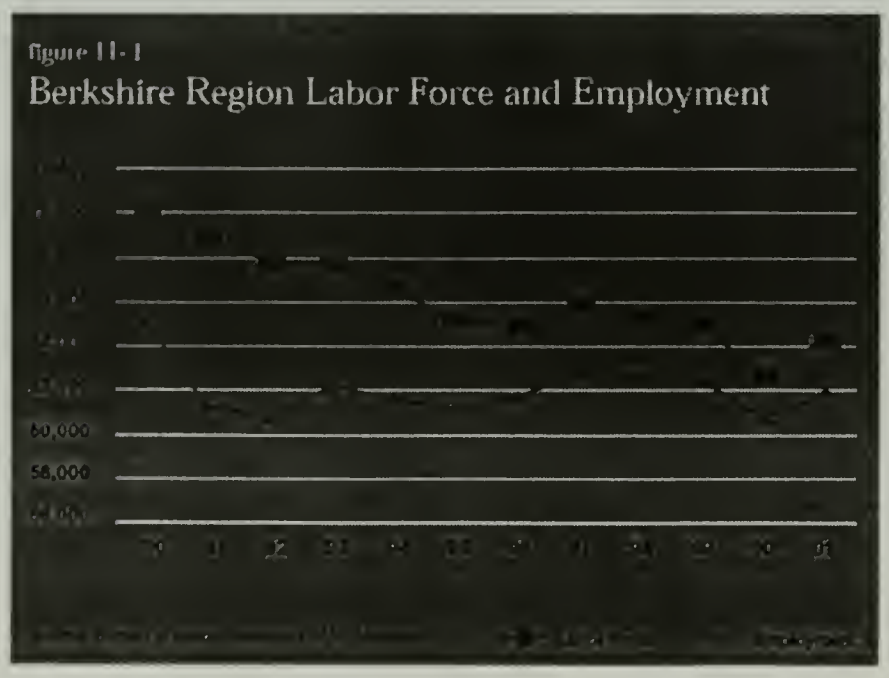
figure 10-17

Policy Options for Regional Priorities

berkshire region



Berkshire County is set off from the rest of the Commonwealth by rolling mountains running north and south and wide valleys offering spectacular natural beauty. This Region has been home to manufacturing plants that grew up along the Housatonic River and in the Region's small industrial cities and towns. This landscape increasingly provides the backdrop for a thriving tourist industry that draws heavily upon a sophisticated, high-income audience, primarily from New York and Connecticut. These tourists come each summer to hear classical music, see world-class dance, enjoy fine art, and rejuvenate in the spas that offer alternative approaches to health and beauty. Each fall, the Berkshires landscape explodes in color and draws people who come to view the spectacular foliage. The winter offers cozy inns, skiing, and its own getaway attractions. Especially in the southern part of the Region, more and more tourists have become part-time residents and now own second homes.



The Berkshire Region is less integrated into the social and economic fabric of Massachusetts than any other in the State. Television and radio stations broadcast from across the border. Pittsfield, its largest city, is typically included in a marketing region with Albany, New York. With neither a major airport nor rail transportation to tie it into the rest of the Commonwealth, the Massachusetts Turnpike in the southern part of the county and Route 2 in the north are the major links to the rest of the State. But like the Berkshire Mountains and Housatonic River, this Region and its economy runs north and south.

Economic Overview

The more recent industrial development of the Berkshires was based, in large part, on the invention of the electric transformer. Sprague Electric and General Electric were major employers. When it was no longer practical or economical to build large transformers in Pittsfield or North Adams, these industries moved out and the economy struggled to find a new base. Manufacturing for the plastics, paper, and defense industries then drove the local economy. With the end of the Cold War, however, the defense business lost nearly 10,000 high-paying jobs. Manufacturing employment continues to shrink here as in the rest of the State.

The growth in business services, health services, educational services, and trade over the years has not been able to replace these higher-paying manufacturing jobs. Travel and Tourism benefits the owners of many small businesses, but their employees tend to have low earnings that are absorbed by high housing costs.

One bright spot has been in the establishment of companies in the software and information systems sector. But the collapse of the IT bubble in the stock market has left the potential for these companies unclear. As the national economy recovers, the core of small IT firms in the Region may survive, but that remains to be seen.

Employment[1]

Employment patterns in the Berkshires are dominated by the sharp cutbacks in its old-line manufacturing industries. Although one would expect both the workforce and employment to grow during the expansion stage of the business cycle, the Berkshires saw both decline over the past decade.

In 1990, the Berkshire's economy had a labor force of 69,900, of which 65,170 were employed. In 2001, at the end of what was the longest period of sustained economic growth in our nation's history, the workforce was approximately 64,350, with roughly 62,000 employed (see figure 11-1). What needs to be kept in mind is the dramatically different pattern - one of growth, especially after 1995 - seen in other regions and the Commonwealth as a whole during this period.

Income

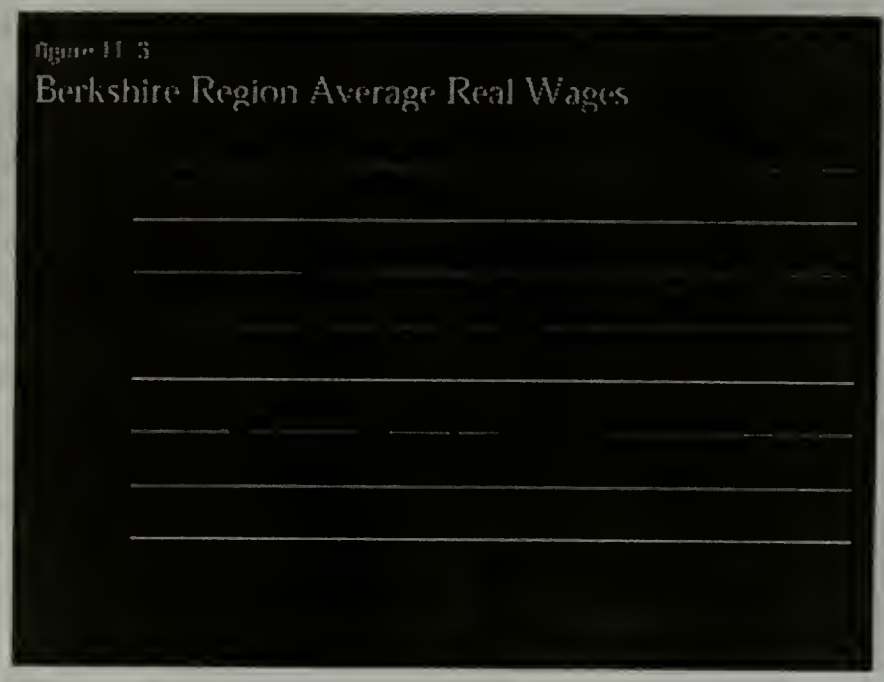
Consistent with stagnating employment and the loss of well-paid manufacturing jobs, average real[2] wages also stagnated. While there was a small rise from 1997 on, wages grew very slowly since 1990. At the end of the decade, they averaged $29,979, compared to $40,127 for the Commonwealth as a whole (see figure 11-3).

[1] The data in this section on the number of people employed, in the labor force, and unemployed are taken from the household survey. They therefore will not match the employer-based data used in other sections that report the number of payroll jobs.

[2] The U.S. consumer price index (CPI) was used to adjust nominal wages for the effects of inflation.

[3] Employment is measured here using the Bureau of Labor Statistics, ES-202 series, which are employer reports of payroll jobs rather than household-based measures of employed or unemployed people. As a result, the numbers will differ from employment figures based on the household survey presented in other sections of the document.





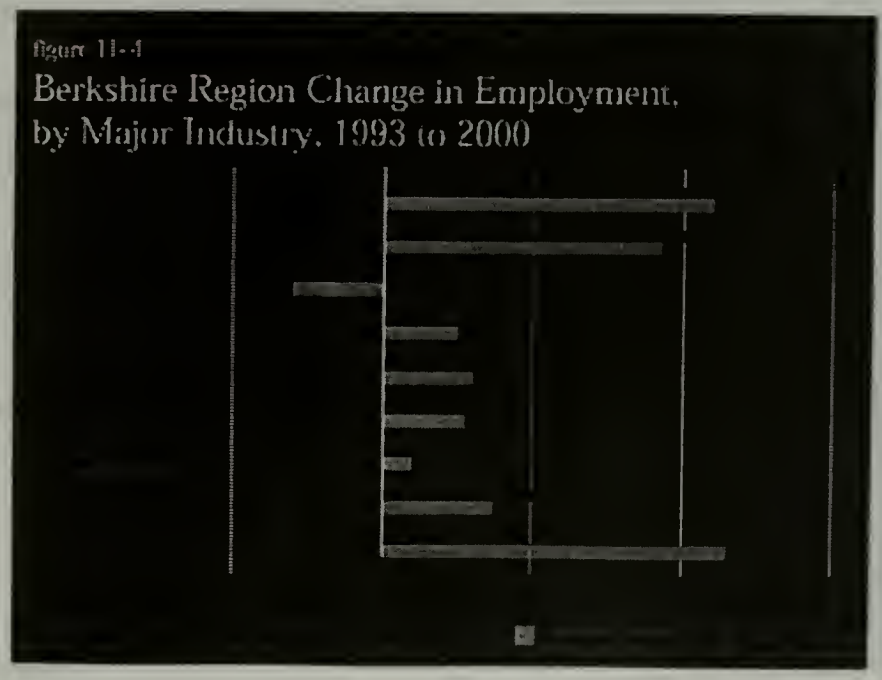


figure 11-5
Change in Real Average Pay, by Major Industry, Berkshire Region: 1993 to 2000

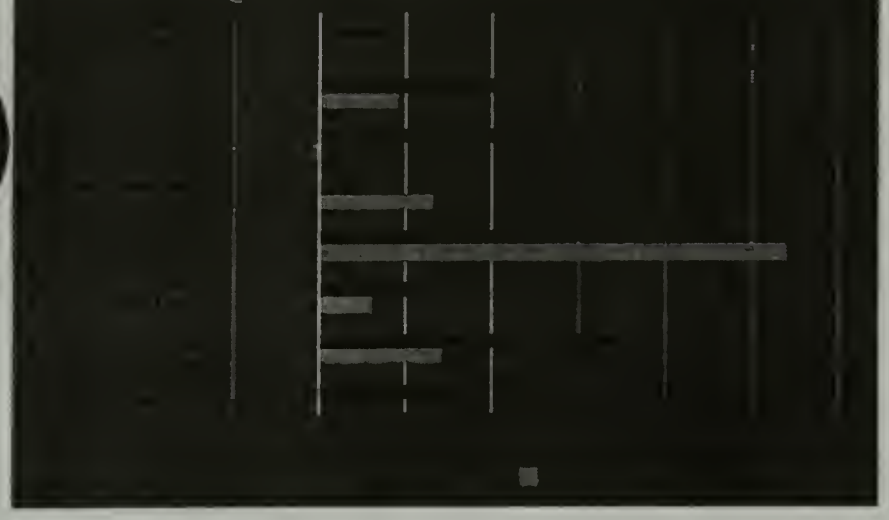


figure 11-6
Berkshire Region Employment by Major Industry

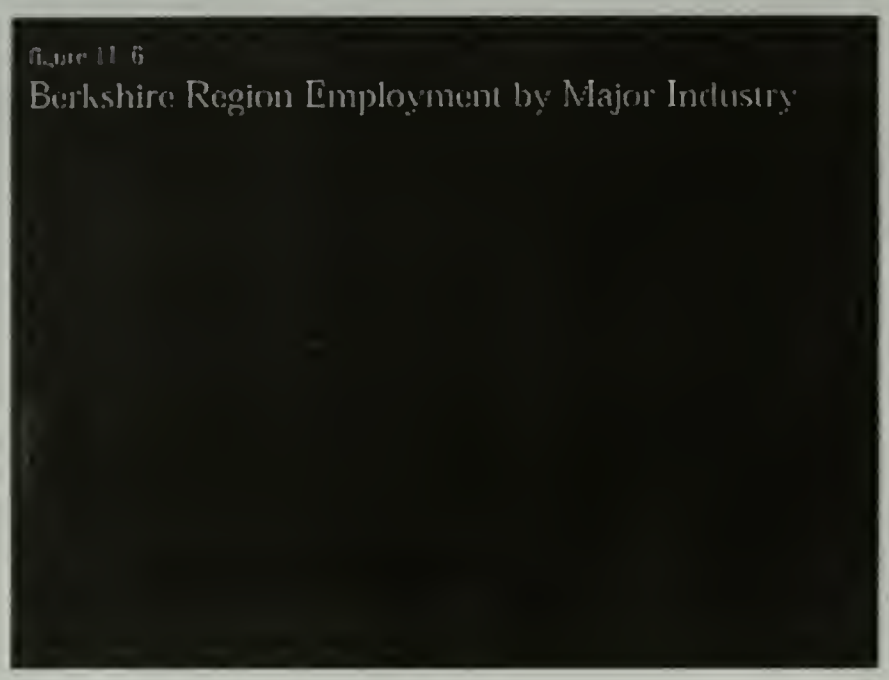
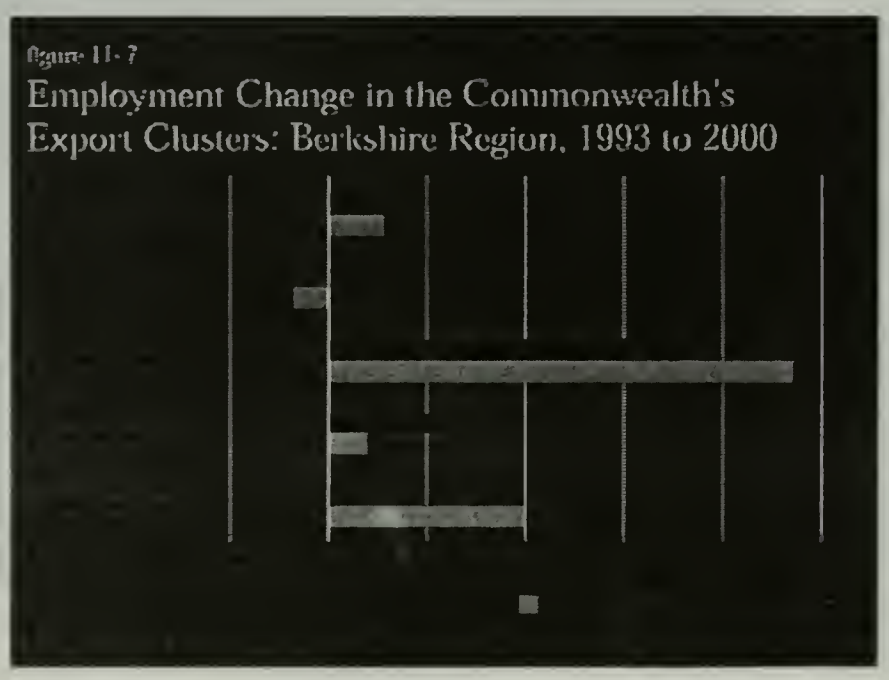


figure 11-7
Employment Change in the Commonwealth's Export Clusters: Berkshire Region, 1993 to 2000



Employment by Major Industry Sector

Compared with the State economy, employment[3] growth between 1993 and 2000 was slower in all categories except government and agriculture (and the actual size of the agricultural sector is rather small). There was some increase in wholesale trade in terms of number of firms and average pay. However, growth in the Region's economy lagged behind the rest of the State (see figure 11-5). Local business leaders confirm a strong economic connection to the Albany area, which had poor economic growth during this period. It appears that this connection did not help bolster the Berkshires economic base.

The most important sectors in the economy in terms of employment are health care, education, business services, and other general services (see figure 11-6). Retail trade provides many jobs that are related to the flow of tourist dollars into the Region. Manufacturing is most heavily concentrated in plastics and paper manufacturing.

The Berkshire Region Export Sector

As explained in Chapter 2, a healthy export sector is critical to a region's economic success. The sidebar in that Chapter on "The Massachusetts Export Sector" presented six large industry clusters as the key components of the Commonwealth's export sector. These clusters were identified in earlier State policy documents and studies, specifically *Choosing to Compete*[4] and the more recent *Knowledge Sector Powerhouse.*[5] They include four knowledge-based clusters - Information Technology, Health Care, Financial Services, and Knowledge Creation. They also include two clusters that are less knowledge intensive: Travel and Tourism; and "Traditional Manufacturing" (manufacturing industries, such as paper, plastics and rubber, metalworking, and machinery, which are not part of the Information Technology or Health Care clusters). The discussion below uses this framework to explore the Region's export sector.

Figure 11-7 shows export cluster growth in the Region as compared to Masachusetts. When interpreting the results of our analysis, please note that the employment figures reported for these large industry clusters are not meant to represent export sector jobs. The Health Care cluster, for example, includes physicians serv- ing the local population. A finer picture of the composition of the Region's export sector, and the extent to which the Berkshires have become part of the wider knowledge-based economy, is developed in the discussions that follow. Also, note that some of the following charts show no data for some industries in the export clusters. This does not necessarily mean that the industry is absent. Federal rules prohibit access to data that could provide information about individual firms. The lack of industry data could be due to this limitation.

Encouragingly, all export-oriented clusters, with the exception of Health Care, grew during the 1993 to 2000 expansion. Information Technology (IT) showed the most growth, nearly doubling in size. It may well be that this cluster can serve as a new growth engine for the Region.[6] More modestly, it could help stabilize the regional economy by countering declines in other sectors.

Knowledge Creation

The Berkshires shows promise in the Knowledge Creation cluster of activities. Other than in the areas of legal and management services, all areas of knowledge creation saw their employment increase in the Region. In virtually all cases, however, this growth was at a lower rate than for the State as a whole (see figure 11-8).

Information Technology[7]

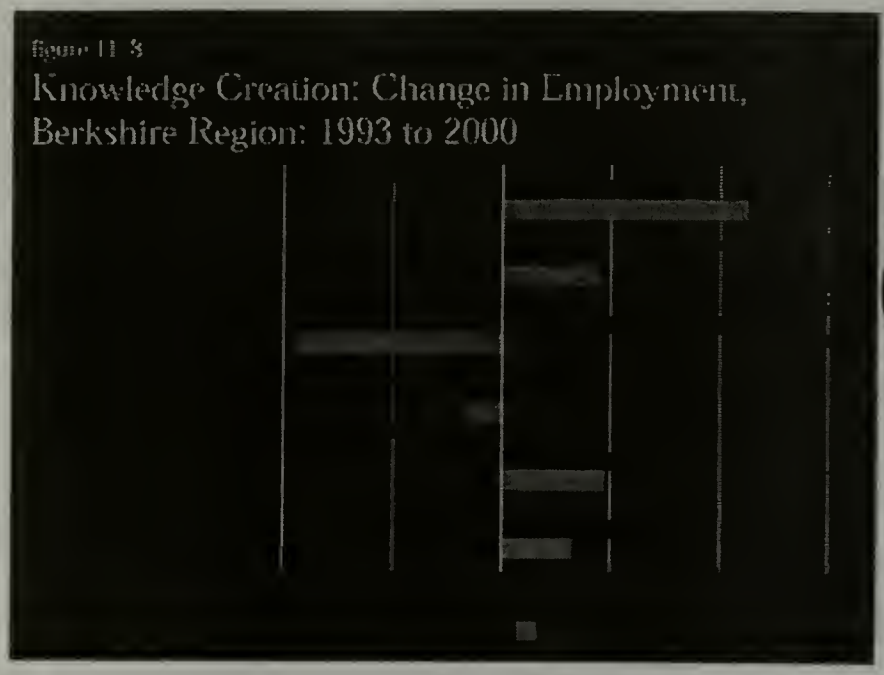
In the small but potentially dynamic information technology area, the Berkshires showed growth and promise, especially in computer services[8](see figure 11-9). The Region did not experience discernable employment increases among manufacturers of computer hardware, communications hardware, or electrical and electronic equipment.[9]

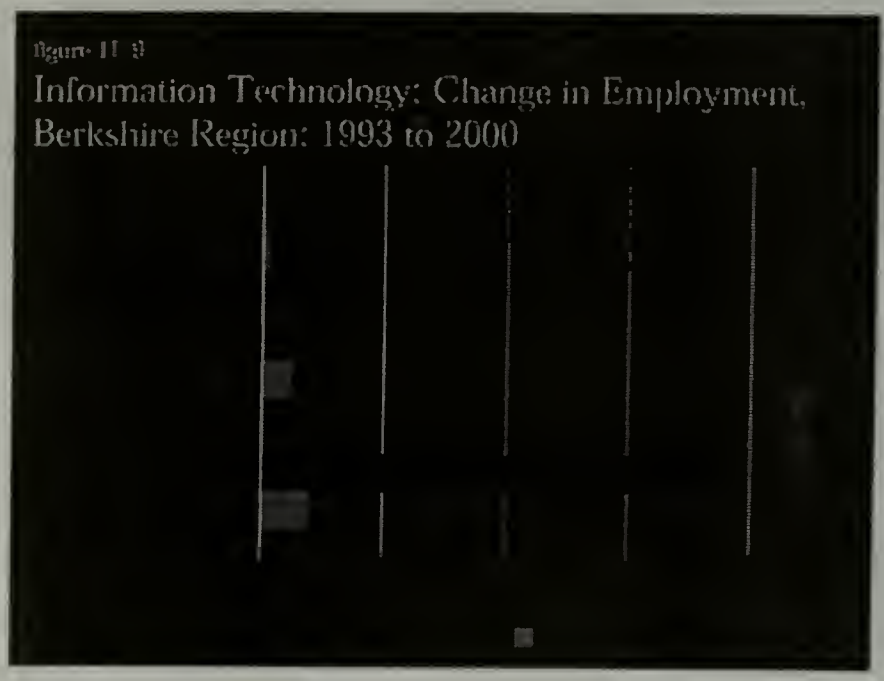
Financial Services

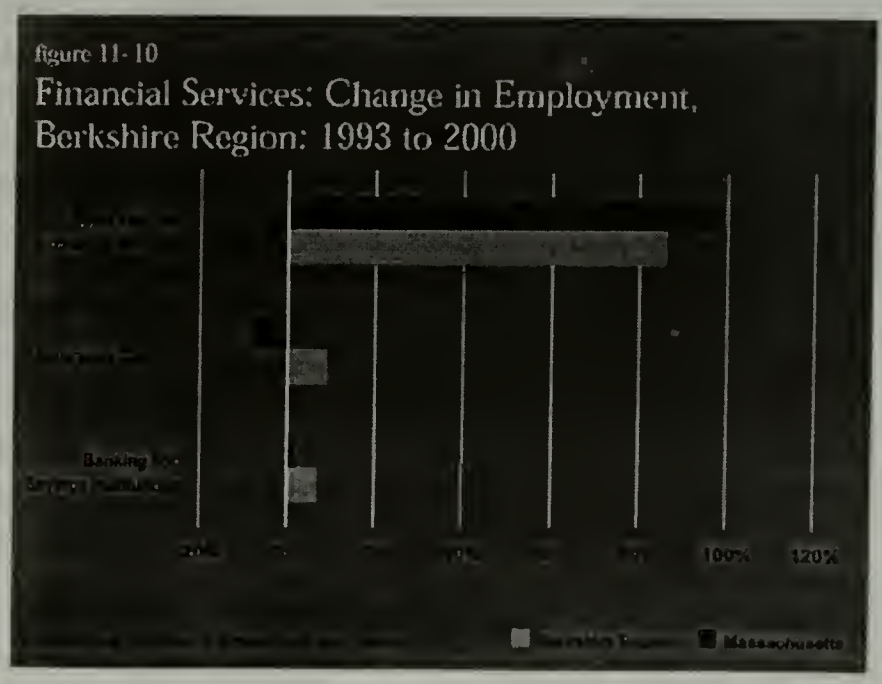
The Berkshire Region exhibited employment growth in all of sectors of the financial services cluster. The most dramatic growth came in securities and exchange services, which grew by over 80 percent between 1993 and 2000 (see figure 11-10). Insurance carriers are most likely to contribute to its export base and employment in this industry expanded in the Region while declining statewide.

Health Care

Healthcare is the largest employer in almost every Massachusetts Region. Berkshire County is no exception. But there is a difference between providing health care for the resident population and providing health-related products and services to people outside the Region to generate income. There is no dis-







[4] Massachusetts Executive Office of Economic Affairs and the University of Massachusetts, (Boston, 1993).

[5] Robert Forrant, Philip Moss, and Chris Tilly, (Boston: UMass Donahue Institute, 2001).

[6] Recent research provides some reason for optimism. Between 1993 and 2000, "technology enterprise" employment grew 132 percent and annual payroll, 190 percent. See Steven Ellis and Rebecca Loveland, *Technology Enterprise in Berkshire County: Economic Analysis*. UMass Donahue Institute, February 2002.

[7] Communications Services comprised three business units in 2000 and Other Electronic and Electrical Equipment comprised seven units in 2000. Data describing these sub-groups in the Berkshires are not available. The Massachusetts Division of Employment and Training suppresses data when there are fewer than three business units in a 4-digit SIC class, to preserve employer confidentiality.

[8] The KSP Subgroup (of the IT Group) "Other Computer Services" comprises the following 4- digit SIC's:
7373 Computer integrated systems design; 7374 Data processing and preparation; 7375 Information retrieval services; 7376 Computer facilities management; 7377Computer rental and leasing; 7378 Computer maintenance and repair, and 7379 Computer related services not elsewhere classified.

[9] The Massachusetts Division of Employment and Training suppresses data for these industries to preserve employer confidentiality.

figure 11-11
Traditional Manufacturing: Change in Employment, Berkshire Region: 1993 to 2000



There is no discernable activity among manufacturers of apparel and instruments.[11]

figure 11-12
Berkshire Region Demographic Summary



Source: U.S. Bureau of the Census, Decennial Population Census

cernable activity in the medical instruments, drugs, and pharmaceuticals industries.[10] This is an industry where the Commonwealth generates significant income through exports. Health services have also declined in terms of employment as the population has decreased. The area of drugs and pharmaceuticals, increasingly related to biotechnology, does not exist in any significant way in the Region. What does exist, however, is a thriving trade in alternative health therapies and spas. This is an interesting aspect of the tourist trade. Many of the upscale visitors to the Berkshires come to be treated or to enjoy alternative health activities and treatments. This is one of the potential growth industries in the Region, and one that can generate substantial amounts of regional income.

Traditional Manufacturing

As discussed above, the Region lost a significant number of manufacturing jobs in the recession of the early 1990s, and the sector continued to shed jobs during the recovery running from 1993 to 2000. The real bright spots in manufacturing have been precision metalworking and plastics. Both of these segments of the economy have done well. The Berkshire Plastics Network or Cooperative is a model for other industries. Through a consortium, companies with specialized knowledge and skills can be matched up with a wide variety of inquiries. The result is more productivity and more business for everyone.

The same is true in metalworking. Like most of Western Massachusetts, the Region is home to many talented craftsmen who have worked with precision metal manufacturing for many years. While the nature of the technology has been changing to include more computer-controlled machines, there is still a base of skill and design necessary in industry available in the Region (see figure 11-11).

Travel and Tourism

The growing impact of the Travel and Tourism cluster in the Berkshires can be seen in the experience of the Region's hotel industry. In the year ending June 2000, hotels and motels in Berkshire County grossed an estimated $77.6 million in room sales, up 27 percent over the year ending June 1997.[12] These expenditures define a conservative estimate of traveler spending. This is because total spending typically includes meals, retail purchases, and attractions, in addition to spending on accommodations.

Room sales growth, which lagged behind statewide growth rate of 37 percent, supported limited growth in the industry. Between 1997 and 2000, the number of hotels increased 1 percent, to eighty-two. Employment expanded 2 percent, to 1,995 workers. Pay in the industry is low and frequently offers mostly part-time jobs. Yet average real wages increased 26 percent in this period, to $19,636.

Demographics

Population

The Region continues to lose population, having declined by 3.2 percent since the 1990 Census. The shape of this population becomes clearer with an examination of age distribution and racial composition (see figure 11-12).

Resident Age Distribution

The average age of the Region's residents rose over the past decade. This is due partly to out-migration of the younger generation and partly to the aging of those who have stayed. A lack of good-paying jobs, social opportunities, and affordable homes makes the retention of young people particularly difficult.

Since 1990, the size of all age groups younger than 45 has declined. The most dramatic decline has been in the 19-24 group,

which declined by 25 percent. The 25-44 age group, often cited as the group being the most economically dynamic, declined by over 14 percent (see figure 11-12). The loss of significant numbers of younger residents of working-age represents a serious workforce development challenge, and a long-term obstacle to growth. As older members of the regional workforce age and begin to retire in coming years, the significance of these population losses will become more apparent.

While the Region's population has a smaller proportion of minorities than the rest of the State, this is changing. In fact, the entire decline in the Berkshire population occurred among the White racial group. All of the non-white racial groups- Black, Asian, and all other racial groups- grew in size. This includes a sizable increase in the Hispanic population[13] (see figure 11-12).

figure 11-13
Berkshire Region Home Ownership

Housing

Market dynamics have placed pressures on middle-income family home ownership. While in 1990 the owner-occupancy rate in the Berkshires significantly exceeded that of the State as a whole, it fell below the statewide average over the past ten years (see figure 11-13). Housing costs vary within the Region with higher costs in the southern part of Berkshire County driven by high demand for second homes.

figure 11-14
Berkshire Region Housing Supply

Regional Strengths and Competitive Advantages

Natural beauty and an exceptional cultural base have been the key growth engines in the Region's export sector over the past decade, and this is the way things are likely to continue. The single most important attribute this Region possesses is its fine quality of life and natural environment.

However, the Berkshires have no special advantages over other regions when it comes to information technology or any of the cutting-edge applications of scientific breakthroughs. It lacks a major research university and it has no special access to major markets. Its workforce is aging and declining in number. Given its low real average wages compared with the rest of the State, the cost of housing is high. These are significant barriers to knowledge-intensive economic growth in the Region.

Looking forward, Berkshire County must build upon its principal strengths. These include high quality of life, natural beauty, and outstanding cultural resources.

---

[10] Ibid.

[11] Ibid.

[12] Estimate based on FY00 State room occupancy tax collections, which are levied at 5.7 percent of the room rate.

[13] Data describing change in race and ethnicity must be used with caution. For more information, see the Part II Introduction.

Challenges to Future Growth

The Berkshires possess a mosaic of economic and social elements that do not optimally support economic development. There is a legacy of industrial development that left serious environmental problems amid great natural beauty. There are wealthy stakeholders who own property and invest in the Region, but are not full-time residents. While they bring income into the local economy, they also bid up the price of housing, particularly in the southern portion of Berkshire County, making it unaffordable for many households. The Region offers outstanding music, art, and dance, but lacks the social opportunities that will attract and hold young families and retain more highly mobile and tech-savvy young professionals.

This mosaic has implications for retaining a productive workforce. As the population continues to age and fewer young people are attracted to the area or choose to remain, opportunities for growth diminish. While young professionals are drawn to the natural beauty of the area, they also are concerned about costly housing, inadequate public transportation, and limited social opportunities.

Lack of accessibility. While the Massachusetts Turnpike provides an important connection to the east and west, the north-south transportation link does not meet the Region's needs. Nor does that link provide easy access to key markets or centers of science or technological research.

Unskilled workforce. The Region does not have an attractive base of young, talented, and well-educated workers. This is a major factor in business investment and location decisions and represents a significant competitive disadvantage.

Depressed urban core. It is often a region's "urban core" that offers young people and families the social opportunities they seek. Many of the Berkshire's cities - particularly Pittsfield - are under serious fiscal strain. While it may be tempting to try to locate large manufacturing facilities in these urban areas in the short term, doing so will not make these cities more attractive to the younger, more highly skilled workers the Region requires to grow. The successful remediation and redevelopment of vacant industrial space, such as the GE facility in Pittsfield, will be essential to the future growth of its urban centers. Improving the attractiveness of cities to highly- skilled younger workers will also be critical to the successful economic restructuring of these communities. The opening of facilities like the Massachusetts Museum of Contemporary Art (Mass MoCA) in North Adams is a good start.

Distance from Boston. The Region's relatively remote location remains both an economic and political disadvantage. Because of its remote location, the Berkshires remain isolated from the eastern Massachusetts economy and its recent growth. That isolation contributes to an historic sense that State development strategies are not always relevant to the Region.

Regional Policy Priorities

The Region has a number of important issues to address. In general, the issues should be taken up at the local and regional levels. Regional participation is important to avoid the "not in my backyard" syndrome.

Urban development. Given resistance to development in its more rural areas, there may be an opportunity to revitalize and redevelop those cities in the Region that both desire and can accommodate economic development.

Environmental preservation. Environmental preservation and cleanup are high on the list of priorities. Though this issue has received attention over the past decade, there is much work yet to be done.

Affordable housing. Providing affordable housing is especially difficult, given that lower- and middle-income housing carries with it the burden of higher public budgets without adequate tax-revenue offsets. Where to encourage housing development and what type of development is best are questions that must be addressed locally. The wise use of capital budgets for improving sewer, water, and roads will greatly influence where development takes place. Likewise, updating outmoded zoning ordinances would aid housing development.

Transportation infrastructure. Air and commuter rail service should link this Region to Boston and other major cities. Some key roadways have been improved, but additional effort is needed.

Attracting professionals. Attracting and keeping young professionals and families is essential. Urban development, improvements to public education, and the enhancement of cultural and social opportunities geared to young singles and families alike can help to stop the exodus of younger residents and workers from the Region.

Regional planning. "Bigger is better" might not be an appropriate theme for Berkshire County. Instead, it may be an ideal place to achieve a smaller, well-diversified economy based on sustainable development. Natural beauty, a fine reputation among upscale consumers, and a steadily declining industrial base all suggest that the wisest approach may be to recruit firms that can find competitive advantage in the Berkshire's idyllic environment and loyal base of well-to-do consumers. Evolving regional collaboration will help define a common vision and the coordinated actions needed to implement sound regional solutions.

Linking the Region's Policy Priorities to Potential Solutions

Part 3 provides a variety of policy options that can help address the Region's economic development priorities. Figure 11-15 shows where to find relevant options.

figure 11-15

Policy Options for Regional Priorities: Berkshire Region



Chapter 4 identified six "competitive imperatives" – policy areas we must address if we hope to strengthen and secure the Commonwealth's economic competitiveness in the new century. That chapter also outlined "desired outcomes" – the goals of our policy options. The following section offers a range of options that can help Massachusetts address these competitive imperatives and achieve our desired outcomes.

These policy options were gathered at regional outreach meetings and from government officials, researchers, and private individuals active in the economic development community. The list is far from exhaustive and includes initiatives that range widely in terms of their cost and ease of implementation. Given the Commonwealth's current strained fiscal health, less costly options can be prioritized and implemented quickly. As our fiscal condition improves, the Commonwealth should consider implementing options requiring a more substantial commitment of human and financial resources.

These options are not the recommendations of the Department of Economic Development or the University of Massachusetts. We offer these options as the beginning of the discussion, not the end. We hope they generate not just thought, but action. Our purpose is to help decision-makers around the Commonwealth create economic development programs that can enhance the State's long-term economic competitiveness. Policymakers can also use our proposals as a point of departure for developing other policies to address these competitive imperatives.

We include brief overviews of each competitive imperative and its related desired outcomes. We then offer these policy options with sufficient detail to inform thought and motivate action. Finally, we propose success measures to help track progress toward attaining our desired outcomes. Part III thus defines three basic components for designing and implementing an economic development strategy:

- **The ends** (competitive imperatives and desired outcomes)
- **The means** (policy options), and
- **The monitoring tools** (success measures).

The chapters in **Part II/Regional Profiles** also list the economic development policy priorities for each of our seven regions, with references to relevant pages in this section.

Improve the Business Climate to Support All Industry Clusters

As described in Chapter 2, the competitive success of six broadly defined export-oriented clusters largely determines the growth and prosperity of the Commonwealth's economy. By exporting goods and services to other states or nations, these industry clusters attract capital, employ workers in jobs that generally pay high wages, and generate demand for local supplier industries and industries that provide goods and services to their workers.

The same economic dynamics are seen at the regional and sub-regional level. A healthy export sector is the key to growth and prosperity. As described in Part II, examples of regional export clusters include distribution in the Tri-City Brockton-Taunton-Attleboro Area of Southeastern Massachusetts, the defense-oriented metalworking cluster in the Pioneer Valley, and the Cape and Islands tourism cluster, with its large in-State clientele. Professor Michael Porter's work on "the competitive advantage of the inner city" can provide a similar program for the economic development for our depressed urban areas.[1]

The Commonwealth needs a systematic approach for developing export-oriented clusters at the State, regional, and sub-regional levels. The Commonwealth has helped to create various successful industry commissions and councils over the years. But no agency is responsible for leading a systematic effort to develop such clusters in a broader sense. Nor do we have any mechanism in place to focus existing economic development efforts on cluster development or to coordinate such efforts across regions.

Desired Outcomes

As outlined in Chapter 4, the Commonwealth will have reached its goal of supporting all export-oriented clusters when it achieves the following desired outcomes:

- **Strong export industry clusters throughout Massachusetts.** The Commonwealth, as well as its regions and sub-regions have vibrant, well-functioning export-oriented clusters that are appropriately networked and linked to the public and non-profit resources necessary for success.

- **Firms in our export industry clusters continually innovate to meet high-value customer needs most effectively.** To compete in an increasingly fast-paced and highly competitive global marketplace, firms must continually innovate and leverage new technologies to better serve the needs of their customers. This is especially important in our export-oriented clusters, for firms rely on each other as suppliers and customers; and their collective success is the critical factor in our overall economic performance.

What Government Can Do

In order to address these desired outcomes, we offer a set of policy options. These policy options are not the recommendations of the authors of this study. Rather, they offer a range of possible approaches to assist key stakeholders develop future policies and programs that support economic growth.

[1] See the Initiative for a Competitive Inner City web site, http://www.icic.org/about/info_and_prospectus.html

Desired outcome: Strong export industry clusters throughout Massachusetts

▸ **Convene a Governor's Council on Competitiveness.** This Council would include private-sector economic advisors, members of seven collaborating regional councils, key administrative officials, and legislative leaders. It will give the Governor and the legislature access to key business concerns throughout the Commonwealth. The Council would explore the contributions State government could make on issues such as cluster development, firm upgrading, and beneficial incentives to business. Council members can also serve as ambassadors to firms considering locating in the Commonwealth, in support of existing programs.

▸ **Organize a State-level office to assist the Commonwealth's export industry clusters.** State government plays a crucial, yet secondary role in cluster development. It can contribute education and training services, needed infrastructure, links to research facilities, and economic analysis mapping the growth and vitality of our clusters. State government can also use its convening power to establish and promote communication among each cluster's private, public, and non-profit participants. The Commonwealth needs to organize and deliver its cluster development services in a more coherent and prioritized fashion.

▸ **Assist regions to develop export industry clusters.** All regions of the Commonwealth need strong export clusters to drive economic growth. However, cluster development requires planning and long-term commitments that exceed the resources available at the county or regional level. The Commonwealth can provide the resources and expertise to identify and develop export-oriented clusters at the regional level.

▸ **Implement an *enhanced* Economic Development Incentive Program (EDIP) to focus on cluster development in economically distressed areas.** The current EDIP has successfully promoted growth in economically targeted areas, helping to create 48,000 new jobs and to retain 80,000 jobs in the Commonwealth. Today, Massachusetts hosts forty-two Economic Target Areas (ETAs), 165 qualifying municipalities and 408 Economic Opportunity Areas (EOAs) or designated sites.[2] The business incentives provided under these programs encourage firms to locate or expand in these critical areas.

[2] An Economic Target Area (ETA) is defined as three or more contiguous census tracts in one or more municipalities, meeting one of nine statutory criteria of economic need. ETAs are located throughout the Commonwealth. An Economic Opportunity Area (EOA) is an area or several areas within a designated ETA of particular need and a priority for economic development. These areas are selected by the individual communities and must meet one of four criteria for designation. For more information, visit the Massachusetts Department of Economic Development's web site, at http://www.Mass.Gov/econ/showpage.asp?file=regional/economictargetareas.htm.

The Commonwealth should help identify the competitive advantages of these distressed areas and help develop vibrant export-oriented clusters that leverage these advantages.

‣ **Implement a strategy that develops export opportunities and foreign direct investment (FDI).** The Commonwealth can improve its ability to market the goods and services of our export-oriented clusters, which are often produced by smaller firms that lack the resources to mount an adequate marketing campaign. This is especially relevant to the Travel and Tourism Cluster. In our knowledge-based clusters, the Commonwealth should also pursue opportunities to attract foreign direct invesment. International firms that locate or expand in Massachusetts increase competition, bring new ideas to the Commonwealth, and thereby improve our competitiveness and capacity for innovation.

Desired outcome: Firms in export-industry clusters continually innovate to meet high-value customer needs most effectively.

‣ **Support firms in our export industry clusters by providing specialized training services.** Our export clusters provide large,well-defined labor markets. They also typically have some form of industry organization that can communicate their training needs to government service providers. It is critical that the Commonwealth remains in close contact with these organizations to coordinate the development of training programs. Such efforts can meet the cluster's needs for skilled workers while providing attractive employment opportunities for our workforce.

‣ **Support firms in our export industry clusters by maintaining strong links with our university system.** Higher education offers research and development (R&D) and training resources to businesses. All too often, businesses are not aware of these resources or do not know how to access them. Regional cluster development should focus on building research relationships and developing college-level curricula and training programs. By leveraging these networks, the Commonwealth can strengthen our firms, workers, and academic institutions.

Success Measures

The following indicators will help the Commonwealth measure its progress toward supporting our export industry clusters:

Strong export-industry clusters throughout Massachusetts

- Growing number of firms and jobs exporting high-value goods and services outside the region or State
- Growing number of firms and employees in knowledge sector firms

The firms in our export industry clusters continually innovate to meet customer needs most effectively.

- Increasing capital investment
- Growing investment in worker training
- Increasing the number of patents awarded, in all regions
- Developing incentives that reward innovation, efficiency, and growth
- Employment growth in areas challenged by high rates of unemployment
- Increasing foreign direct investment and export growth
- Expanding linkages between business and higher education, particularly outside the Greater Boston area

Support Entrepreneurship and Innovation

Massachusetts has an abundance of assets in the area of entrepreneurship and innovation. The Commonwealth attracts substantial venture capital (VC) investment that supports the creation of new business ventures. Much of this investment leverages the State's solid knowledge creation network, comprised of universities, laboratories, incubators, angel investors, and supporting service firms. The State is also a leader in attracting federal investments in research and development (R&D).

However, the Commonwealth also faces challenges to its leadership position. The State's infrastructure supporting innovation is large and diverse, which makes it hard for new or small entrepreneurs to navigate and succeed. The Commonwealth does not actively celebrate and promote entrepreneurship (We have no bridge, tunnel, or courthouse that honors DEC's Kenneth Olsen or MIT's "Doc" Edgerton). There are also striking regional disparities in entrepreneurship and VC investments. The State's intake of federal R&D funds is increasingly shifting toward life sciences research and away from military technology and the physical sciences and State support for R&D in Massachusetts is among the lowest in the United States. Other states, meanwhile, are investing in their R&D infrastructure and becoming more competitive in securing federal R&D dollars.

Desired Outcomes

As developed in Chapter 4, the Commonwealth will have reached its goal of supporting entrepreneurship and innovation when it achieves the following desired outcomes:

- **A statewide climate where entrepreneurs flourish.** The calculated assumption of risk forms the foundation of entrepreneurship. The Commonwealth's ideal future

incliudes market-and culture-based incentives that encourage entrepreneurial behavior. That future also entails an enhanced business environment that fosters communication and resource coordination throughout the Commonwealth.

- **Reduced disparities in entrepreneurial opportunities.** Currently, entrepreneurship and innovation are heavily weighted to the Greater Boston region of Massachusetts. Our ideal future incliudes vigorous and well-funded entrepreneurial communities throughout the Commonwealth and among traditionally underrepresented groups. This broadening of the entrepreneurial community will encourage greater specialization and competitiveness and higher incomes for the citizens of Massachusetts.

- **A strengthened technological innovation infrastructure.** Our knowledge creation resources are among our most important assets supporting economic development. In the future, these assets will remain highly competitive and secure expanded funding for science and technology research.

What Government Can Do

In order to address these desired outcomes, we offer a set of policy options. These policy options are not the recommendations of the authors of this study. Rather, they offer a range of possible approaches to assist key stakeholders develop future policies and programs that support economic growth.

Desired outcome: A statewide climate where entrepreneurs flourish.

1. Establish an informed leadership framework for the entrepreneurial community.

- **Establish an Entrepreneurship Advisory Council.** The spirit of technical innovation has deep roots in the Commonwealth. However, today's business leaders do not see Massachusetts supporting entrepreneurship as vigorously as competing technology states, such as California. An Advisory Council to the Governor can raise the visibility of issues salient to the entrepreneurial community and focus government action on improving the Commonwealth's support for innovation. As the State's "Chief Entrepreneurial Officer," the Governor can take the lead in promoting entrepreneurship and focus popular attention on this key engine of the Massachusetts economy.

- **Establish a Center for Entrepreneurship.** Such a Center can address key gaps in supporting new business creation in the Commonwealth. Initially located within State government, the Center can be a clearinghouse for knowledge, resources, and best practices for government and business. The Center can also benchmark the Commonwealth's business climate and support for entrepreneurship as compared to competing States. Ultimately, the Center would operate independently of State government.

2. Improve the coordination, communication, and delivery of services to the entrepreneurial community.

- **Ensure that State and quasi-public organizations provide services that meet the needs of small businesses.** The Commonwealth's economic development structure was last redesigned in the early 1990s. As described in Chapter 2, the Massachusetts economy has changed in important ways since then. A review of State economic development organizations and their missions in light of these new realities could lead to a significant realignment of service delivery.

3. Effectively communicate the Commonwealth's commitment and success at serving the needs of its entrepreneurial community.

- **Improve perception of Massachusetts as a State for business.** Support for business and entrepreneurship has improved significantly in the Commonwealth since the 1993 publication of *Choosing to Compete* – and State government's shift from an adversarial to a collaborative approach toward business. For example, a recent study by the Beacon Hill Institute[3] ranked the Commonwealth second among all states in an index measuring competitiveness. Yet the perceptions of key leaders are not aligned with the data. In the same study, a survey of business executives, public servants, and academics ranked the Commonwealth among the lowest of eight states on a range of issues, incliuding human resources, financing and environmental policy. The Commonwealth must not only continue to improve its business climate, it must also improve perceptions about Massachusetts held by both in-state and out-of-state business leaders.

Desired outcome: Reduced disparities in entreprenurial opportunities

1. Increase venture capital availability outside I-495.

- **Task MTDC to develop a strategic plan to drive increasing VC investments outside the Greater Boston area.** Since 1979, the Massachusetts Technology Development Corporation (MTDC) has successfully invested State resources in Massachusetts-based technology ventures. This expertise provides an excellent foundation for

[3] *State Competitiveness Report*, 2001. Beacon Hill Institute, 2001

developing a realistic plan to boost investment in technology-based ventures in other regions of the Commonwealth. MTDC funding could be increased, should additional resources become available, to help implement the plan.

- **Create regional angel investor networks, connecting VC investors to new opportunities.** Active angel investors frequently focus on opportunities located close to their area of operations. The Commonwealth enjoys several networks of angel investors, each active in distinct regions of the State. A strategy of "networking the networks" can expose more potential investors to more business opportunities across the State.

- **Provide pre-venture technical assistance to firms.** Many firms interested in soliciting VC funding need help analyzing and documenting their proposed business opportunity. The proposition must also be developed in ways that account for current market conditions and investor preferences. The Commonwealth can help firms create fundable business plans, then provide effective ways to leverage networks of VC and angel investors.

- **Help firms with new or emerging technologies develop fundable credit profiles.** Firms introducing new technologies to the market often face difficulty in securing financing. This is because potential lenders do not understand the technology or, more importantly, because the new technology lacks a "track record" on which to assess risk. The Commonwealth should provide resources to help firms explain new technologies to potential lenders and develop appropriate credit profiles.

2. Broaden the State's entrepreneurial community.

- **Conduct venture forums and training programs to promote entrepreneurship among women, minorities, and in all regions.** Regionally focused events and training programs can help enhance the visibility and raise the sights of entrepreneurs throughout the Commonwealth. These events can provide practical training on the fundamentals needed to succeed. Targeting underrepresented populations will tap new sources of talent, develop entrepreneurship relevant to local conditions, and more broadly develop the economy of the Commonwealth.

- **Develop a web-based marketplace linking entrepreneurs to opportunities and information.** Currently, entrepreneurs cannot easily locate accurate information describing capital resources in the Commonwealth. Also, owners interested in selling small businesses and prospective buyers often cannot easily find each other. Internet-based applications can make information more accessible and create a small business marketplace in the Commonwealth. State government and the business community should leverage current initiatives like Mass.Gov and Mass-Connect to create these resources.

- **Monitor and support successes accrued by regional technology-networking initiatives.** Regional technology and entrepreneurship programs are just beginning to take root in the Commonwealth. In western Massachusetts, the Regional Technology Alliance (RTA) is establishing networks to quicken the pace of innovation and technology commercialization. Similarly, the Federal and State Technology Partnership program (FAST) will provide targeted outreach and services to increase the number of innovative technology businesses outside Greater Boston. State and regional policy makers should closely monitor the progress of these programs, leverage appropriate lessons, build on their successes, and provide support to expand and/or replicate successful models in other regions.

Desired outcome: A strengthened technological innovation infrastructure

- **Establish a leadership body for the research community in the Commonwealth.** Such a leadership body should develop an R&D strategic plan, monitor technology and funding trends, provide a network for collaboration, and ensure that the Commonwealth remains a leader in attracting federal R&D funds. It can also provide a direct link between the Commonwealth's research establishment and State government. This leadership body could be a task force drawn from the Governor's Council on Competitiveness described in the section entitled "Strong Export Industry Clusters throughout Massachusetts" on page 118.

- **Develop a strategic plan for science and technology investments and policy in the Commonwealth.** Today, many competing proposals for enhancing our science and technology system vie for support. They range from expanded funding for public-sector research facilities, to establishing R&D "Centers of Excellence," to developing a statewide network of regional incubators. A comprehensive strategy with a prioritized agenda for State government investments is needed that clearly links the strengths of the Commonwealth's research institutions to current and emerging trends in federal funding and private-sector R&D spending. Such a strategy can form a common agenda for

collaboration among academic institutions, firms, and government and can project an integrated and feasible investment plan that will support the Commonwealth's competitiveness over the long-term.

- **Dedicate resources to identify, track, and shape federal R&D policy in Washington, D.C.** Currently, the Commonwealth does not have staff dedicated to track and influence the development of federal R&D policy. Such a staff can develop relationships with various government agencies, learn about R&D funding trends and opportunities, and ensure efficient interaction between federal funders and the Massachusetts entities receiving the funds.

- **Explore ways to support federal research applicants and grant winners.** Applicants for federal grants increasingly face the requirement of State matching funds. Federal R&D funding recipients often face financial difficulties in moving ahead with their research agendas after initial funding. State support, financial or otherwise, can help Massachusetts institutions win competitive grants and can enhance the potential for converting such research into successful business ventures.

- **Provide strategic investments in R&D infrastructure in our public colleges and universities.** Our public colleges and universities have created excellent R&D centers. Successful science and technology facilities were developed in Lowell, Amherst and New Bedford, with strategic State capital investments. These centers offer a model for how strategic science and technology investments can successfully extend the Commonwealth's innovation infrastructure into underserved regions and communities. Select investments, as part of a broad science and technology strategy, can help our public universities contribute more effectively to the Commonwealth's economic development objectives.

Success Measures

The Commonwealth proposes a number of success indicators to track progress toward supporting entrepreneurship and innovation:

A statewide climate where entrepreneurs flourish

- Increased levels of firm formation and micro-enterprise creation
- Increased availability of VC and traditional capital
- Improved perception of the Commonwealth's support for entrepreneurship and innovation
- Increased activity in terms of initial public offerings (IPO's) and mergers and acquisitions
- Increased number of public-traded fast growth companies

Reduced disparities in entrepreneurial opportunities

- Increased firm formation across the Commonwealth and among underrepresented populations
- Increased availability of VC and traditional capital investments outside the Greater Boston region and among underrepresented populations

A strengthened technological innovation infrastructure

- Sustained or growing share of federal R&D funds
- Increased success in competition for R&D funding beyond defense and health care
- Growing private R&D investment
- Rising numbers of patents and technology licenses, with activity spreading to new regions of the Commonwealth
- Expanding numbers of "knowledge workers" (professional and technical workers)
- Improved national rankings in State investments in R&D and in the effectiveness of that investment

Prepare the Workforce of the 21st Century

The Commonwealth increasingly relies on the contributions of a well-educated, highly skilled, and flexible workforce. Our firms require such talent to succeed. And our workers need education, skills, and flexibility to meet the demands of a competitive marketplace.

Preparing such a workforce is never easy. Several specific challenges, however complicate our task. The Commonwealth's workforce is growing very slowly. It would not be growing at all were it not for significant inflows of immigrant labor. The skills of our available workers thus become critical. Our employers continue to face shortages in key knowledge-intensive occupations, particularly in science and engineering fields. Over time, employers will continue to face challenges in filling such highly-skilled positions. A large portion of our workforce, on the other hand, lacks the basic skills necessary to function and compete in our knowledge-based economy. The Commonwealth's workforce development system, which is responsible for addressing issues of workforce preparedness, remains limited and ill-coordinated. Too many workers, even participants in our job training programs, fail to get the skills that they or our employers need.

Desired Outcomes

For an economic development strategy to be effective, it must first define what it hopes to accomplish. As developed in Chapter 4, the Commonwealth will have reached its goal of a workforce prepared for the twenty-first century when it achieves the following desired outcomes:

- **Our firms have access to the talent they need to succeed.** Employers need workers who can read, write, and compute; who can assume responsibility for sophisticated tasks; and who have both the appropriate technical and the "soft" interpersonal skills needed to function effectively in teams. In the future, our employers should not have to conduct national or global searches to fill many of their most important positions.

- **Worker skills match the needs of business and the competitive environment.** Today's workers need a solid educational foundation, relevant technical and workplace skills, and the ability to adjust to a rapidly changing economy. It is expected that jobs that require an associate level degree or greater will grow the fastest.[4] In the future, all of our workers must have the opportunity to obtain the education and training required to earn a middle-level income and to keep pace with workplace changes throughout their careers.

There are various approaches for achieving each of these outcomes. Take the first – expanding the supply of talent in the Commonwealth. Our schools could improve the quality of their career-oriented programs. Employers could strengthen internal training programs or their involvement with external providers. The Commonwealth could step up efforts to attract and retain superior talent. Under each approach, there is an array of initiatives that could expand the supply of talent in the Commonwealth.

What Government Can Do

In order to address these desired outcomes, we offer a set of policy options. These policy options are not the recommendations of the authors of this study. Rather, they offer a range of possible approaches to assist key stakeholders in developing future policies and programs that support economic growth.

Desired outcome: Our firms have access to the talent they need to succeed

1. Improve the quality and employer involvement in the career-oriented programs provided by our schools.

- **Expand school-to-work programs.** These programs link businesses and education in ways that expose our students to future career paths. These programs can help drive future career choices, focus curricula around practical, "real world" problems, and introduce students to many "soft" skills needed to succeed in the workplace. Centers of Excellence, establishing links between local workforce investment boards, middle and high schools, businesses, and teachers, provide a model for expanded business involvement. These outcomes can improve the quality of education for students and their future employers.

- **Support more curricula development between businesses and our institutions of higher education.** Cooperative curricula design is a logical extension of other successful collaborations between business and higher education. As partners, businesses and educational institutions can make education more meaningful and effective for the local workforce. Business and educators should work together to ensure students are receiving a broad-based education, while developing the specific skills that will prepare them for the local job opportunities. One example is the collaboration between the University of Massachusetts, the community colleges and the information technology industry through the Commonwealth Information Technology Initiative (CITI) project. Higher educational institutions should be encouraged to pursue similar efforts to collaboratively

[4] For details, see Division of Employment and Training, Economic Analysis Department, *Massachusetts Employment Projections through 2008: A Focus on the Jobs, the Industries, and the Workforce, 2000.*

develop appropriate curricula with representatives of rapidly growing industry clusters like the life sciences.

- **Organize and support a campaign to promote the study of math/science and engineering.** Expand programs like the "Engineering in Massachusetts Collaborative" (EiMC) to other colleges and regions. The EiMC brings together leaders from business and education who are devoted to increasing the number of graduates in science and technology programs. While the Collaborative draws its Executive Committee from across the State, it functions primarily at the University of Massachusetts, Lowell campus, the Worcester Polytechnic Institute, Northeastern University, and Tufts University. Expansion to other campuses would extend this important network to other regions of the Commonwealth.

2. Strengthen employer involvement in worker training.

- **Enhance industry-driven training programs such as the Workforce Training Fund (WTF) and Building Essential Skills through Training (BEST).** The WTF, funded by an employer-paid unemployment insurance contribution, provides resources to Massachusetts businesses to improve employee skills. The BEST initiative funds regional and collaborative proposals that enhance the skills of front-line workers. These proposals must have the support of the Local Workforce Investment Board (LWIB), businesses, education or training providers, and organized labor.

3. Step up the Commonwealth's efforts to attract and retain superior talent.

- **Establish marketing programs to attract students and retain graduates at our institutions of higher education.** More than 75 percent of all students who graduate from our public institutions of higher education settle in the Commonwealth. A much smaller share of students at our private institutions makes the same choice. The Commonwealth has a strong interest in encouraging private college students to remain in the State to live and work. Educating these audiences regarding available opportunities could increase the supply of skilled workers in our economy.

- **Create financial incentives that reward students for staying in Massachusetts.** Loan forgiveness or deferral programs can encourage in-State and out-of-state college students to live and work in the Commonwealth. Similar incentives can encourage in-State students to pursue knowledge-intensive occupations and remain in Massachusetts. The Commonwealth Futures Program and Tomorrow's Teachers Scholarship Program are two examples.

Desired outcome: Worker skills match the needs of business and the competitive environment

1. Every Massachusetts resident graduates from high school with the necessary skills to compete and advance to higher education, if desired.

- **Maintain the commitment to education reform.** The three-tiered reform strategy dates to 1993 and includes increased school funding, student testing, and the enforcement of school performance standards. This long-term strategy is just beginning to yield notable improvements in many communities. Continued commitment to these reforms will benefit our children, our communities, and our businesses.

- **Target resources and policy attention to reduce dropout rates in our high schools.** High school dropouts make up a substantial share of the Commonwealth's workforce that lack basic skills. A small number of high schools in the Commonwealth – mostly in urban areas – generate the majority of our dropouts. Focused attention and programs such as school-to-work initiatives and career mentoring should help these high schools sharply reduce their dropout rate.

- **Assure adequate instruction in mathematics, science, and engineering.** Strong instruction needs to begin at the middle school level, if not earlier. Success requires a solution to the severe shortage of K-12 math and science teachers. Our public colleges and universities, which train the bulk of our teachers, must also have the resources necessary to be able to retain computer science and engineering faculty who are being recruited by other states and industries.

2. Provide the higher education required for workers to attain a better standard of living.

- **Tie public education budgets to increasing enrollments in targeted programs, such as science and technology.** Our public colleges and universities are important sources of the Commonwealth's skilled workforce. In the future, the State should explore various ways to encourage public colleges and universities to boost the number of graduates in fields such as science, education, and healthcare programs.

- **Develop transitional programs.** A greater proportion of our high school students need to have the opportunity to attend college, particularly students from urban areas and under-represented groups. We should encourage high school students in skills training programs to enter college-track programs and community college students to continue their studies at a university to secure a four-year degree.

- **Invest in higher education.** So that all students in the Common- wealth have access to a high-quality college education, both operating and capital expenditures-per-student in Massachusetts should be comparable to those in competing knowledge-based states.

3. Adult education is available to help Massachusetts residents become and/or remain more competitive.

- **Improve the availability of Adult Basic Education (ABE) and English for Speakers of Other Language (ESOL) training.** The demand for these programs far outstrips availability. Classes are often held at inconvenient times and places, and potential students are often not aware of available training opportunities. Solving these problems would significantly expand the skill base of our workforce, benefiting employers and workers alike.

- **Revise ABE curricula to focus on workplace training.** Employers frequently note that ABE programs stress academics over practical skills training that students could use in the workplace. Increasing emphasis on workplace skills can boost the immediate impact of ABE for both students and employers, and thus make these programs more attractive. Employers and training providers should collaborate to devise ways to accomplish this goal.

4. Develop an effective "lifelong learning training" system, so that every Massachusetts worker can upgrade his or her skills.

- **Coordinate responsibilities for workforce development and education among appropriate State agencies.** Education and workforce training have distinct roles in supporting the continuous, lifelong learning of the Commonwealth's workforce. Defining clear and distinct roles for public primary education, public higher education, and the adult workforce development system, in support of lifelong learning, can ensure effective allocation of limited resources while minimizing duplication and mission overlap. The overall objective of all entities involved in workforce development must be to ensure that the Massachusetts workers receive the education and training they require to compete in the new knowledge-based economy. This will require these institutions to periodically adapt their programs to meet the needs of a changing economy.

- **Empower the State Workforce Investment Board (SWIB) to lead the skills training portion of workforce policy development.** The SWIB coordinates and oversees workforce development programs funded by the Workforce Investment Act (WIA). Workforce training resources outside WIA-funded programs should be brought into a single, integrated system. With a strong private-sector voice, the SWIB can pursue an aggressive, long-term agenda of performance-driven change and be held accountable for measurable results.

- **Improve career center responsiveness to individual and business needs.** Our career centers are the Commonwealth's "one stop" workforce development resource for individuals and businesses. These career centers should be the cornerstone of our workforce development system and, as such, be the service delivery mechanism for both job seekers and business alike. Businesses need to be made aware that these centers are places where they can list job openings and find the workers they need. While individuals must exercise initiative to advance their careers, these centers provide important resources to individuals who want to build skills and remain competitive. Yet many job seekers and businesses do not know about these centers, their mission, and their resources. Expanded marketing and a greater use of the Internet and other new technologies could significantly improve their visibility and effectiveness.

Success Measures

The Commonwealth proposes a number of success indicators to help track progress toward achieving desired outcomes relating to workforce improvement:

Our firms have access to the talent they need to succeed

- Rising share of out-of-State college students who remain in our State to live and work
- Greater number of in-State college students graduating from science, education, and health care degree programs
- Increasing private-sector investment in worker training
- Growing number of partnerships between business and education
- Rising share of high school students displaying proficiency in math and science
- Increased share of high school graduates entering college

Worker skills match the needs of business and the competitive environment

- Businesses define their training and education needs and share them with education and training providers through partnerships
- Falling high school dropout rates among Massachusetts students
- Rising standardized test scores throughout the Commonwealth
- Significantly shortened waiting lists for Adult Basic Education and English for Speakers of Other Language classes, provided at varied times and days of week
- Strengthened State Workforce Investment Board (SWIB), measured in terms of progress implementing the SWIB strategic plan

- Clear workforce development policy mandates for public primary education, public higher education, and workforce development
- Increasing percentage of Massachusetts residents possess four-year degrees

Build the Information Infrastructure of the 21st Century

High-speed Internet connectivity has emerged as a critical element of the infrastructure of the new knowledge-based economy. As good roads and access to affordable electric power is essential to the economic success of businesses and regions, the same can now be said about access to affordable high-speed Internet (or "broadband") services.

Massachusetts is a leading State in terms of the availability of high-speed Internet access. A range of technological, market, and regulatory hurdles, however, make broadband services either unavailable or too expensive in many areas of the Commonwealth. Small businesses and those who maintain small offices often cannot afford high-speed access provided over dedicated T-1 telephone lines. Alternatives, such as DSL or cable modem services, are either unavailable or not optimized for business use. If our small businesses are to compete in today's fast-paced, knowledge-based, and increasingly global economy, access to a range of affordable broadband services is essential Such an infrastructure will also help our citizens get the information and resources needed to succeed and prosper.

Desired Outcome

As developed in Chapter 4, the Commonwealth will have reached its goal of building an information infrastructure for twenty-first century when it achieves the following desired outcome:

Access to affordable competitive broadband options throughout the Commonwealth.

What Government Can Do

In order to address this desired outcome, we offer a set of policy options. These policy options are not the recommendations of the authors of this study. Rather, they offer a range of possible approaches to help stakeholders develop future policies and programs that support economic growth.

1. Strengthen public-private partnerships for broadband deployment.

- **Establish a Governor's informal working group to determine the broadband needs and priorities for small and medium-sized businesses.** This group can highlight needs, priorities, and roles for government. The working group can also stress the importance of broadband affordability, while advising the Governor on appropriate strategies and programs.

- **Direct the Massachusetts Technology Collaborative (MTC) to develop a strategy for broadband deployment.** MTC is uniquely positioned to convene the parties interested in broadband deployment, conduct the necessary research, and craft an optimal strategy for broadband development.

  That strategy should define roles for government and the private sector and identify specific measurable goals addressing connectivity speed and availability. MTC can maintain and revise the strategy, as needed, to accommodate other emerging telecommunications technologies.

- **Pursue a "no harm policy," with the intent to minimize regulation and interference.** Federal and state governments regulate telecommunications services, but the private sector provides the necessary infrastructure investment. Arbitrary regulation changes could have major adverse implications for broadband service delivery. A pledge to maintain a predictable and "technology neutral" environment would encourage current providers to continue investing in infrastructure and service delivery.

2. Leverage our available resources to encourage deployment.

- **Establish a broadband authority to facilitate deployment.** Some states, like Michigan, have created a formal broadband authority to ensure uniform oversight over matters such as pole and conduit rights-of-way, as well as to provide financing capacity. Currently, local governments impose a variety of levies when providing access to rights-of way for broadband providers. To enhance efficiency and ensure uniform practices, a State- level authority could collect the access fees and pass on a portion of the revenues to local governments. Additional fees collected could be used to provide low interest loans to fund deployment in underserved areas.

- **Track broadband deployment trends and best practices.** Developing a strategy for broadband deployment requires a clear understanding of trends and barriers that bear on service availability and of successful deployment programs throughout the world. Tracking best practices can help benchmark our progress and identify new policy alternatives.

- **Study the implications of using the Commonwealth's telecom buying power to support demand aggregation and infrastructure build-out.** The Commonwealth invests approximately $40 million in voice and data transmission services per year. The State should be able to leverage its market power to support regional demand

aggregation or infrastructure build-out efforts. However, the potential outcomes, as well as potential costs for the Commonwealth, are not well understood. A formal study would help Massachusetts determine options that can best boost the availability of affordable services.

- **Commit the Commonwealth to becoming a cutting-edge technology user.** Limited demand is one reason why affordable broadband service has not reached all regions of the State. The Commonwealth can help boost demand by committing itself to use telecom applications and technologies to improve its delivery of government services. One option is to provide broadband-based economic development services to businesses through the MassConnect project, the State's economic development web portal, as well as Mass.gov.

- **Fully develop opportunities offered by the Universal Service Fund (USF).** Under the direction of Congress, the Federal Communications Commission (FCC) developed the Federal USF to bridge the "digital divide" and promote telecommunications services to under-served communities. The four areas targeted by the USF are low income, high cost, schools and libraries, and rural health care markets. The Commonwealth should study all four areas to ensure it is gaining its "fair share" of funding, and apply USF resources to foster broadband deployment.

3. Achieve facilities-based competition through expanded private investment.

- **Evaluate and apply lessons learned from current demand aggregation programs.** Today, there are a number of demand aggregation efforts underway in different regions throughout the Commonwealth. However, the State lacks a clear understanding of progress, remaining unmet demand, and other factors bearing on successful aggregation. An objective assessment can help the Commonwealth determine how to expand demand aggregation efforts most effectively within and across regions.

- **Simplify local oversight of broadband service delivery.** The technical details and industry dynamics associated with broadband service delivery present a serious challenge to local governments to provide effective oversight. State government can help communities respond to these challenges by providing various forms of technical assistance, including model franchising agreements, as well as customer aggregation tools to encourage broadband deployment. Updated guidance on wireless siting laws can help communities adopt bylaws that better respond to local needs. A statewide fund to insure communities against wireless tower abandonment would enhance trust among communities and providers. The Commonwealth can also help communities identify qualified technical expertise by developing a consultant registry and offer alternatives to protracted legal proceedings over tower siting.

- **Explore tax incentives to encourage build-out in under-served areas.** The Commonwealth can use tax incentives to encourage expanded availability of affordable broadband options. For example, providers could recover the cost of access fees levied by cities and towns through a tax credit of equal value. In considering such changes, there is limited knowledge of what incentive structure could most effectively advance the Commonwealth's broadband deployment goals. A detailed analysis can identify the costs for the Commonwealth, as well the benefits accrued, for incentives that encourage broadband deployment.

4. Build strong links between business and education.

- **Establish telecommunications and information manage- ment programs for managers, systems maintenance workers, and technicians.** The Commonwealth currently lacks sufficient education and training programs to meet the needs of the telecommunications services industry. Employers in the State have significant needs at the manager, system maintenance, and field technician levels. Our telecommunications service providers and employers should define the needed skills, and our colleges, universities, community colleges, and vocational schools should provide the needed training. These programs can help address the significant skill gaps among industry workers and increase the State's attractiveness to employers.

Success Measures

The following measures can help the Commonwealth measure progress toward achieving its desired outcome for building the information infrastructure of the twenty-first century:

- A Statewide strategy for affordable broadband deployment
- An increasing number of businesses and households with access to affordable broadband options
- An increasing number of broadband service providers in all regions of the Commonwealth
- A capability for mapping and tracking the status of broadband deployment in the Commonwealth, as well as the means to monitor and disseminate best practices developed worldwide
- An increase in broadband investment is achieved in through improved regulatory policies

Ensure that Economic Growth is Compatible with Community and Environment

Massachusetts must develop growth strategies designed to balance economic development with the needs of our communities and the environment. The Commonwealth must meet the challenges created by rapidly escalating housing prices and increased infrastructure demands, while limiting sprawl and environmental damage. Effective management of these issues is fundamental to preserving our attractiveness to businesses and to providing a high quality of life for our citizens. These growth challenges need to be addressed in a way that encourages cooperation between the State and our cities and towns. State government can – and should – leverage the strength of our communities by providing support and incentives to promote sustainable growth patterns.

Desired Outcomes

As described in Chapter 4, the Commonwealth can meet these challenges by achieving the following desired outcomes:

- **Massachusetts is a leader in implementing development strategies that preserve a high quality of life.** Massachusetts is not alone in confronting challenges generated by rapid and uneven growth. Land use patterns throughout the nation are often inefficient, generating significant environmental and social costs. These include traffic congestion, degraded water quality, air pollution, urban disinvestment, and loss of farmland and open space. Exercising leadership in growth planning will help ensure that our State remains an excellent place in which to live and grow.

- **Massachusetts implements housing affordability solutions to support growing businesses and their employees.** High housing costs present a serious challenge to employers seeking to attract and retain workers. An increased supply of housing should moderate price increases. This will make the State a more attractive location for business expansion.

What Government Can Do

In order to address these desired outcomes we offer a set of policy options. These policy options are not the recommendations of the authors of this study. Rather, they offer a range of possible approaches to assist key stakeholders develop future policies and programs that support economic growth.

Desired outcome: Massachusetts is a leader in implementing development strategies that preserve a high quality of life

- **Create a high-level State planning body to develop a vision for balanced growth in the Commonwealth.** Such a body could be a committee of State agency leaders or a non-partisan commission that includes the regional planning agencies (RPAs). It would develop a coordinated policy that encourages higher-density development in interested regions, ensures that State funding does not subsidize sprawl, and strengthens planning efforts at the local level. A commission could take on a broader mandate, including greater coordination among regions and support development of statewide community preservation goals (CPGs) that can encourage adoption by cities and towns.

- **Inventory the Commonwealth's infrastructure needs and community preservation goals (CPGs).** A comprehensive inventory of the Commonwealth's infrastructure can provide a baseline for developing investment and usage priorities. The State can offer guidance to cities and towns in the development of CPGs and apply them to the inventory to prioritize infrastructure investments. Communities or regions proposing development projects with high CPG scores per investment dollar would gain priority access to infrastructure funds. CPGs can provide standards all State agencies can apply to ensure their programs do not subsidize sprawl and disjointed infrastructure investment and that they encourage housing affordability.

- **Issue State Development Grants with bonding authority allotted to a State Planning Commission.** A planning commission could encourage higher density development through financial resources or incentives. One financial resource could be proceeds from the sale of State bonds. The Commission could use the funds to sponsor necessary studies and to support infrastructure investments that are consistent with the Commonwealth's community preservation goals (CPGs).

- **Create incentives to encourage higher density development.** The current trend toward low density development is driven by existing regulations, market dynamics, the preferences of existing homeowners, and the fact that the costs of sprawl are borne by "the public" rather than by the developer or home buyer. Creative incentive structures could persuade the private sector and local governments to consider other options. Encouraging change will also require a public-private partnership to develop "best practices" and offer examples of model development. Enhancing the Economic Development Incentive Program (EDIP) to encourage higher density development, downtown redevelopment, and public transportation-oriented development programs could encourage developers to pur-

sue more sustainable development options. Similarly, the State could provide enhanced local aid or sustainable development grant funds to communities that develop comprehensive plans and advance the Commonwealth's community preservation goals (CPGs).

- **Expand the roles of regional planning agencies (RPAs) and metropolitan planning offices (MPOs) to provide enhanced planning capacity to communities.** Regional planning agencies provide critical transportation, economic development, housing, environmental, and other planning services for their regions. As such, they enjoy an accepted regional mandate on issues closely related to development. An expanded mandate, with expanded capacity, would allow the RPAs to provide cities and towns with resources to pursue their planning objectives in a more comprehensive fashion. They could help develop model zoning plans, address infrastructure challenges, or limit low density development. In this capacity, they would serve as a resource, not an additional oversight body.

- **Provide an increased investment tax credit (ITC) on total project investment related to "brownfields" and "greyfields" development.** The Commonwealth has made much progress on the cleanup and reuse of contaminated industrial properties often referred to as "brownfields." However, many properties–including greyfields–remain vacant or underutilized. The term "greyfields" is often associated with large vacant or underutilized paved areas adjacent to primarily retail real estate uses. Legislation can structure the ITC to encourage property reuse that supports higher density development, including mixed-use development. Enhanced tax credits can provide additional financial incentive to developers.

- **Create urban and suburban "model zoning" for use in brownfields and greyfields development.** Many communities lack the expertise to comprehend the science and regulations bearing on site reuse and development. Model zoning can help communities understand the opportunities and limitations inherent in brownfields and greyfields redevelopment. Model zoning should also be accompanied by "best practice" examples of model development.

Desired outcome: Massachusetts implements housing affordability solutions to support growing businesses and their employees

- **Provide housing affordability awareness through regional forums.** Organize regional forums to help communities understand and address their housing needs.

- **Enhance Economic Development Incentive Program (EDIP) incentives to encourage development of affordable housing solutions.** The State's EDIP program currently provides an Investment Tax Credit and Tax Increment Financing for qualified properties in targeted communities. The Commonwealth should extend the program to support affordable, higher density housing. Agencies that comprise the Economic Assistance Coordinating Council (EACC) should also develop model zoning that allows higher density uses.[5]

- **Reduce barriers to housing development created by local bylaws.** The Department of Environmental Protection (DEP) provides overall guidance on Title 5, regulations governing the installation and maintenance of septic systems. There are those who argue that some local bylaws that exceed DEP guidance are not based on sound science and put unnecessary burdens on the development of new housing. Local boards of health should be required to submit documentation of the need to exceed Title 5 requirements. The Department of Housing and Community Development (DHCD) and DEP should also provide guidance and education on the subject to local boards of health.

- **Provide zoning and permit coordination to encourage housing development.** The State should support further study of density regulations and develop model zoning regulations to encourage balanced development and to discourage sprawl. The Commonwealth should work with the Massachusetts Municipal Association (MMA) to review local permitting fee structures and to develop alternatives to municipal growth control by-laws that limit housing production.

- **Provide incentives for employer assisted housing programs.** The State could provide tax incentives to businesses that develop employer-assisted housing programs that support their workforce needs in local communities.

- **Allow the transfer of development rights for affordable housing.** The transfer of affordable housing rights among

[5] The EACC is co-chaired by the Director of Department of Economic Development and the Department of Housing and Community Development. EACC membership includes the Massachusetts Office of Business Development and the Department of Labor and Workforce Development. The EACC also includes seven gubernatorial appointees representing higher education and six regions in the Commonwealth, all with expertise in economic development issues.

communities can help lead to regional solutions to the availability of affordable housing. Currently, many communities resist efforts to increase the affordable housing stock under Chapter 40B regulations. Transferability would allow communities to exchange the requirement to create additional affordable housing stock for cash or other support, such as regionalized services.

Success Measures

The Commonwealth will progress toward its goals when:

Massachusetts is a leader in implementing development growth strategies to preserve high quality of life

- The Commonwealth's number of residents per urbanized acre increases over time, while the number per acre in rural areas remains stable
- The population and economic output of the Commonwealth's struggling urban areas increases
- A State-level planning entity articulates a clear vision and goals for balanced development
- State agencies prioritize the funding of infrastructure projects that support higher density development
- Cities and towns gain additional resources to plan for balanced growth

Massachusetts implements housing affordability solutions to support growing businesses and their employees

- The Commonwealth develops a clear definition for affordable housing needs that considers regional differences
- The share of housing stock considered affordable increases in all regions of the Commonwealth

Improve the Outcomes of Government Action

Government actions shape economic development in several important ways. These include tax policy, infrastructure investment, regulation, education subsidies, industry support and public-private partnerships. Since the release of *Choosing to Compete*, the State has developed a strategic response that uses these government levers to improve the business climate. In the future, a knowledge-led economy will benefit even more from a government that simplifies service delivery and focuses on collaborative approaches. Governments increasingly rely on information technologies to communicate effectively with its constituents, respond to their needs, and promote a competitive business climate. The most successful states will be better positioned to attract and retain innovation-driven businesses that enhance the economic prosperity of their residents.

The Commonwealth confronts several challenges to improving the outcomes generated by State and local government. Information on government services is often difficult to access and understand, especially for smaller businesses. Regulatory reform in the Commonwealth has improved the situation, but more work needs to be done. Increasing emphasis on collaborative forms of regulation has yet to reward innovation or efficiency gains. Nor has this emphasis encouraged the deployment of new technologies that lower costs. Current budgetary pressures add urgency to the need for efficiency in government. The business community expects government to maintain fiscal stability and, predictability, while not imposing regulations that constrain business growth. Finally, the need for efficiency in government has assumed new urgency in the aftermath of terrorist attacks in September 2001. At a time of severe budget constraints, State and local governments must take on the added responsibilities to assure the security of our people and infrastructure.

Desired Outcomes

As described in Chapter 4, the Commonwealth will have reached its goal of improving the outcomes of government action when it achieves the following desired outcomes:

- **State government provides more effective and better-coordinated services and resources to businesses, particularly small businesses.** State government provides closely related economic development services through multiple agencies. This approach has benefits, including greater specialization and flexibility. But current service delivery is inadequately coordinated, small businesses have a hard time understanding the system and are often unaware of useful services and resources.

- **Business and government develop "wise" regulations.** Seeking ways to improve regulation is critical to the relation-

ship between business and government. While regulation often increases transaction costs for firms, it also protects the public and assures entrepreneurs a level and competitive playing field. Business and government, traditionally placed in adversarial roles, must seek outcomes that benefit both their interests to create regulations that lower transaction costs, simplify compliance, and create opportunities for collaboration.

- **Massachusetts is widely recognized as a leader among States in developing innovations in government.** A commitment to leadership can move the Commonwealth to implement substantial improvements in the delivery of government services and provide more effective support for business activity.

- **Massachusetts enhances the competitiveness of its regions by reducing costs impacting all businesses.** The Commonwealth will never be a low-cost State in which to conduct business. However, the Commonwealth cannot ignore the cost of doing business if it is to be an attractive place for firms to form and grow. Lowering costs, or making cost-growth predictable, will encourage the formation of export industry clusters in all regions of the Commonwealth.

- **Massachusetts has a well-coordinated and effective response to terrorist attacks.** Attacks and disruptions could substantially damage our economy, as well as cause death and serious injury. Government must do all it can to prevent attacks and to respond effectively to mitigate impacts.

What Government Can Do

In order to address these desired outcomes we offer a set of policy options. These policy options are not the recommendations of the authors of this study. Rather, they offer a range of possible approaches to assist key stakeholders develop future policies and programs that support economic growth.

Desired outcome: State government provides more effective and better-coordinated services and resources to businesses, particularly small businesses

Create a strategic focus and shared vision among economic development agencies and quasi-publics.

- Analyze agency mandates to identify ways to increase the efficiency of economic development services. Several State agencies provide significant economic development services. Chief among these are the Department of Economic Development (DED), the Department of Labor and Workforce Development (DLWD), Department of Housing and Community Development (DHCD) and the Office of Consumer Affairs and Business Regulation (OCABR). A periodic review of agency mandates, resources, and activities can identify opportunities to eliminate duplication and maximize the use of public funds.

- **Explore ways to improve the coordination of quasi-public activities that provide economic development services.** The State has a number of quasi-public entities that promote economic development. The Quasi-Public Planning Council (QPPC) is charged with orchestrating the efforts of these varied entities toward a common purpose. The Governor should charge the QPPC members with developing plans that address a common set of priorities for economic development and imprové cross-agency coordination.

- **Encourage collaborative marketing and outreach among economic development agencies and quasi-publics.** Various State agencies simultaneously pursue marketing programs to promote economic development in the Common- wealth. This uncoordinated strategy often leads to contradictory or duplicative messages. Collaborative marketing strategies and an integrated marketing plan, possibly through a single brand manager, can deliver clear, linked messages about economic development and reduce administrative costs.

- **Continue support for the MassConnect initiative to enhance economic development through the Internet.** The initiative, in concert with the Mass.Gov effort, has made progress towards providing business with a "one stop" clearinghouse for public and private economic development information. The portal can also provide information on regulations and other resources to strengthen the relationship between business and government.

Desired outcome: Business and government develop "wise" regulations

1. Create a "wise regulation" mandate within government.

- **Create leadership and capacity in State government to evaluate and improve regulation.** The Commonwealth has made great strides in eliminating unnecessary regulations and opening up its regulatory process. However, senior staff in the Governor's Office or the Executive Office of Administration and Finance should ensure that agencies develop new regulations in a coordinated manner, that they adequately account for the needs of businesses, and that they subject all existing regulations to periodic a "sunset" review to determine if they are still needed.

2. Enhance regulatory effectiveness and efficiency.

- **Ensure all proposed regulations are clear and have favorable cost/benefit ratios.** Regulations are often vague and difficult to understand, especially for small businesses that often lack "in house" regulatory expertise. Agencies should express all regulations utilizing the simplest terms possible to ensure that all businesses can understand the terms and intent of compliance. Also, no future regulation should be proposed without a clear estimate of implementation costs and estimated benefits.

- **Direct a cross-agency review of regulations affecting small business.** Such a review can identify regulations that are difficult to understand and impose unduly difficult compliance requirements. This process can direct agencies to develop solutions that improve the responsiveness of government and simplify compliance. It can also identify unreasonable regulations that have no clear public benefit and should be eliminated. For example, such a review could improve the coordination of building and specialty codes to reduce barriers to housing development.

Desired outcome: Massachusetts is widely recognized as a leader among States in developing innovations in government

1. Create an environment that promotes change in government.

- **Create an Office of Innovations in Government.** The State's difficult financial situation provides new impetus to build on existing initiatives and create such an entity to achieve significant improvements in organizational design and service delivery. Current efforts should clearly focus on cost effectiveness. All innovations, however, must be customer focused, measuring value by targeting the needs of citizens and businesses and be subject to rigorous performance measurement. To succeed, such an entity requires high-level leadership from within the Governor's Office or the Executive Office of Administration and Finance.

2. Promote the use of "best practices" in government.

- **Analyze "best practices" with public/private partnerships and privatization.** The Office of Innovations can take the lead in studying effective innovations developed in other states, including government partnerships and privatization. Research findings can form the basis for innovations in Massachusetts.

- **Explore current opportunities to improve service delivery and program administration.** The Commonwealth has two on- going initiatives, Mass.gov and the Managing for Results Initiative (MRI), that can be platforms for further government innovation. This policy option also includes the application of best practices to the needs of the Commonwealth. Agencies can also apply management concepts such as "zero-based" budgeting and activity-based costing to drive fresh approaches to service delivery.

- **Encourage evaluation of alternative technologies and reasonable scientific inquiry in the regulation of business.** The University of Massachusetts and the Executive Office of Environmental Affairs, for example, created the Strategic Environmental Technology Partnership (STEP) in 1994 to help devise innovative solutions to environmental issues. In 2000, STEP served 125 firms and collaborated on 35 research and development projects in several areas, including mercury reduction, wind power, and food waste recycling. The Commonwealth should encourage additional research to develop technologies that support better alternatives to existing standards and requirements. Current examples that affect housing develop-ment in the Commonwealth include the use of shared septic systems, and the re-evaluation of the science that forms the basis for Title V septic regulations.

- **Recognize "good compliers" for exceeding compliance standards.** Many firms in the Commonwealth devote considerable energy to meeting or exceeding compliance standards set by State regulators. These efforts have positive benefits for our citizens, but often go without public recognition. Investing the effort to identify and recognize these corporate "good citizens" can raise awareness of compliance and encourage similar behavior among other firms.

Desired outcome: Massachusetts enhances the competitiveness of its regions by reducing costs impacting all businesses

- **Reform tax policies to encourage innovation and increase predictability.** The Commonwealth can implement several changes that encourage investment and boost incentives for research. In the appropriate fiscal environment, a reform agenda should explore costs to the Commonwealth, as well as opportunities. A number of measures can make a difference, such as tax credits for training and making the investment tax credit (ITC) permanent. Allowing for the sale of unused tax certificates can offer immediate benefits to firms. For example, extended research and development (R&D) cycles prevent many firms from taking full advantage of the R&D tax credit. Allowing for sale of R&D certificates can help

firms gain financial benefits immediately, rather than in the future.

- **Help employers, State government, and our Health Care cluster address rising health care costs.** The Commonwealth is a global leader in the development of health care technologies and the delivery of health care services. However, rapidly rising health care costs are placing increasing pressure on employer and public-sector budgets, both in the Commonwealth and elsewhere. DED should collaborate with leading players in our Health Care cluster and with the Governor's task force on Health Care to find ways to control costs and enhance efficiency. This will not only help our local economy, but also help the Commonwealth become a leader in developing export- able strategies for managing health care delivery systems.[6]

- **Examine and pursue Unemployment Insurance (UI) reform.** Current UI laws impose upper and lower limits on what firms pay into the UI trust fund. Firms with limited layoff activity pay into the trust fund more than their layoffs cost while firms with extensive activity pay less than the cost of their layoffs. This imbalance results in higher costs for businesses in industries with limited layoff activity, which subsidize UI costs for firms with high layoff activity. Changes can help lower business costs for industries with limited layoff activity and encourage firms to retain employees.

Desired outcome: Massachusetts offers a well-coordinated and effective response to terrorist attacks

1. Improve security at airports, seaports, and other nodes of commerce and travel.

- **Establish standard-setting security improvements at Logan International Airport and other transportation facilities.** Much of America's traveling public – including business travelers – remains skeptical of airport security. Many of the Commonwealth's other transportation modes, including seaports and intermodal transportation points, remain vulnerable to terrorist attack and are a focal point of public concern. Aggressive measures to increase the security at these facilities would limit threats, decrease insurance premiums, and help restore public confidence. Restored traveler confidence would also boost the Commonwealth's travel and tourism industry.

2. Involve the private sector in the development of homeland security policy.

- **Ensure the voice of business is present on advisory board(s) relating to public security and disaster response.** The Commonwealth's preparation for future attacks and disruptions will have implications for our businesses and other major employers. As such, the private sector should have a voice in planning and oversight. Private industry has capabilities and resources that could be beneficial to the Commonwealth in the event of an emergency. Private industry has an interest in ensuring that preparations are effective and anticipate a range of potential future scenarios without imposing undue additional costs. One option is to ensure the DED Director sits on any governmental task force established to coordinate Commonwealth security. Another option is to develop a private-sector advisory council on homeland defense. Either option can help ensure that government addresses the needs of business.

- **Business and government collaborate to inventory infrastructure risks.** Government agencies will plan to protect and restore critical infrastructure as part of the disaster planning process. However, these planners may not account for the infrastructure needs of our businesses, especially our knowledge-intensive businesses. Understanding which infrastructure assets are most critical to the private sector would help speed recovery and the restoration of normal business activity in the event of an emergency.

Success Measures

The Commonwealth will progress toward achieving its vision of if it attains the desired outcomes for improving government action:

State government provides more effective and better coordinated services and resources to businesses, particularly small businesses.

- The Commonwealth develops a single, well-coordinated marketing plan

[6] To learn more about the task force and its recommendations, see the Massachusetts Health Care Task Force Final Report to the Task Force From the Co-Chairs and Working Groups at http://www.state.ma.us/healthcare/.

- The Commonwealth continues its financial commitment to e-government initiatives that enhance economic development through the Internet

Business and Government develop "wise" regulations

- All regulations affecting small businesses are clear, inexpensive to implement, and impose reasonable costs relative to public benefit
- Regulations affecting business are subjected to a "sunset review" every three years
- The state is recognized as a leader in regulatory reform

Massachusetts is widely recognized as a leader among states in developing innovations in government

- The Commonwealth is ranked as a top innovator by leading institutions, such as: The Innovations in Government Program at the Kennedy School of Government at Harvard University; The National Center for Public Productivity at Rutgers University and The National Governor's Association Center for Best Practices
- The Commonwealth implements reforms – developed both in the Commonwealth and in other States – that cut costs and/or improve the quality of service deliver.
- The Commonwealth demonstrates leadership in developing new technologies that improve current standards and regulations

Massachusetts enhances the competition of its regions by reducing costs impacting all businesses

- Employer health care costs grow at rates not exceeding the national average
- State government males every effort to enhance the predictability of costs imposed on the private sector.
- Massachusetts prioritizes unemployment insurance reform.

Massachusetts offers a well-coordinated and effective response to terrorist attacks

- The Commonwealth's transportation facilities earn the highest security ratings from appropriate federal agencies
- State government and the private sector collaborate to develop realistic disaster preparation and recovery plans that account for the capabilities and concerns of the private sector.

Acknowledgements

Toward a New Prosperity: Building Regional Competitiveness Across the Commonwealth was prepared at the request and direction Governor Jane Swift. This strategy represents a collaborative effort between the Department of Economic Development, Elizabeth F. Ames, Director, and the University of Massachusetts. In addition, numerous other state agencies and private sector stakeholders played an invaluable role in the collection, analysis and interpretation of state and national economic data and policy.

This project was directed by John G. Troast, Jr., Director of Policy for the Department of Economic Development. Arthur Robert, Deputy Director of Policy at the Department was responsible for overall project management. The team at the Department of Economic Development included Alex Sutton, Owen Kane, Kristine Graney Foye, Maureen Harrington, Courtney Wheaton, Diana Salemy, Priscila Cardoso, Andrea Parhamovich, Susan Saia, Robin Pezzone, Vera Balmazi, Benay Carlino, and Sharon Cowell.

The University of Massachusetts provided extensive research and logistical support. University of Massachusetts President William M. Bulger's commitment was critical to the successful completion of this project. The Maurice A. Donahue Institute for Governmental Services led the UMass effort. Dr. J. Lynn Griesemer, Executive Director, coordinated the participation of the University of Massachusetts in the project. Dr. Michael Goodman, Director of Economic Research and Analysis directed the Institute's research efforts. The team at the Donahue Institute consisted of Janice Raftery, Rebecca Loveland, Carolyn Mailler, James Palma, Andrew Hall, Robert Lacey, Jacqui Adams, Leslie Ackles, Michael Palladino, Kate Modzelewski, and David Trumbull. The contribution of Thomas Chmura, University of Massachusetts Vice President of Economic Development, and John Hoey of the President's Office are gratefully acknowledged.

Phil Auerswald and Steven Sass provided invaluable analytical and editorial support to this endeavor.

The ongoing advice and assistance of Professor Michael Porter of the Harvard Business School and of Jeffrey Grogan of the Monitor Group is gratefully acknowledged.

The project benefited from the input of a group of advisors convened on June 7th, 2001 and included: Tom Chmura, University of Massachusetts Boston; Robert Nakosteen, University of Massachusetts Amherst; Alan Clayton Matthews, University of Massachusetts Boston; Jeff Grogan, Monitor Group; Steve P. Crosby, Secretary of Administration and Finance; Craig Moore, University of Massachusetts Amherst; Michael Porter, Harvard Business School; and Tripp Jones, MassINC.

The initial project scope was outlined in a background paper entitled *Competitive Imperatives for the Commonwealth.* This was prepared under the direction of John G. Troast, Jr. by Philip Auerswald, Ph.D., Stephen Feinson, T. Finbarr Livesey and Josh Glickman, working as part of a DED research team supported by Deputy Director of Policy Arthur Robert.

Part I of this report was written by Steven Sass, John G. Troast, Jr. and Arthur Robert. Portions of Chapter 3 are adapted from *Competitive Imperatives for the Commonwealth.*

The regional profiles contained in Part II were prepared by six UMass faculty members who serve as regional analysts for *Massachusetts Benchmarks,* published by the University, in cooperation with the Federal Reserve Bank of Boston.

The regional analysts are Dr. David Terkla UMass Boston (Greater Boston); Dr. Robert Forrant, UMass Lowell (Northeast); Dr. Clyde Barrow, UMass Dartmouth (Southeast, Cape and Islands); Dr. John Mullin, UMass Amherst (Central); Dr. Robert Nakosteen, UMass Amherst, (Pioneer Valley); and Dr. Craig Moore, UMass Amherst (Berkshires).

Part III was written by Arthur Robert and John G. Troast, Jr. Steven Sass edited the document and Kevin Shea was the copy editor.

Scott Madden and his team at Connelly Partners/CGN provided design and document production services.

Background research was developed by Phil Primack, of The Donahue Institute; Jennifer Gaudet and Professors Chris Tilly, Phil Moss, and Hal Salzman from University of Massachusetts Lowell; Karl Seidman, of the Massachusetts Institute of Technology; Phil Auerswald from John F. Kennedy School of Government, Harvard University; Robert Kispert, of Massachusetts Technology Collaborative; and Robert Seamans, from the UMass Donahue Institute.

A team of contractors and interns including: Yanni Chen, Philip Clayton, Rachael Dobson, Katherine Fox, Christopher Lim, and Andrew Reid, assisted in the preparation of background research.

Representatives of numerous state agencies and quasi-public institutions provided valuable input. These include:

From the Office of Business Development: John Urban, Director; Joseph Donovan, Dean Serpa, Frank Dicker, Kathleen Lopes, Christine Low, George Mazareas, Tina Martin, Camille Passatempo, Brenda Reynolds, Richard Sweeney, Stephanie Cronin, Mary Keefe, Nick Polechronis, Orlando Salazar, Peter Milano, Matt Kerwood, Arthur Levin, John Sweklo, Sue Torino, Keith Rattell, Julian Munnich, Karl Kildahl, Anne Vigeant, Joe Freitas, Dennis Hanks, Bobby Matthews and Norma Sylvia.

From the Massachusetts Office of Travel and Tourism: Paul Sacco, Director, Mary-Jane McKenna, former Director, Jonathan Hyde, Mary Hayes, Kevin Leary, Raymond Richard, and Steven Walsh.

From the Office of International Trade: Elizabeth Bulman, Robin Rogers, and Brandon Pyers.

From of the Massachusetts Technology Collaborative: Mitch Adams, Director; Thomas Hubbard, Bob Kispert, Kevin Paulsen, Colin Cook, Conrad Crawford and Peter Pratt.

From Department of Labor and Workforce Development: Janice Tatarka and Kimberly McLaughlin.

From the Division of Employment and Training: Jack King, Rick Wakefield, and Eliot Winer.

From the Governor's Education Office: James Peyser and Jennifer James.

From Board of Higher Education: Judy Gill and David McCauley.

From the Office of Consumer Affairs and Business Regulation: Jennifer Davis Carey.

From the Information Technology Division: David Lewis, Director and Bob Nevins.

From the Department of Housing and Community Development: Peter Abair, Sarah Young, Marilyn Contreas, Emmy Hahn, Elizabeth Miley, and Bill Reyett.

From the Executive Office of Environmental Affairs: Gina McCarthy, Priscila Geigis and Kurt Gaertner.

From the Executive Office of Administration and Finance: Carlo Desantis.

From the Executive Office of Transportation and Construction: Astrid Glynn.

From the Executive Office of Public Safety: Mike O'Toole.

From the Massachusetts Seaport Advisory Council: Rick Armstrong, Director and Kristin Decas.

From the Governor's Office for Brownfield Revitalization: Todd Fernandez and Nancy Jackson.

The project is grateful to the numerous individuals that reviewed drafts of the document including, Jeffrey Grogan, Pedro Arboleda, and Kurt Dassel, from The Monitor Group; Carole Cowan, President, Middlesex Community College; David Tibbetts, General Counsel, Merrimack Valley Economic Development Council; Frederick S. Breimyer, State Street Bank & Trust Company; Jim Klocke, Vice President of Public Policy, Greater Boston Chamber of Commerce; Victor DeSantis, Associate Professor of Political Science, Bridgewater State College; Bonnie Coughlin, Director of Public Affairs, Verizon; Chris Cooney, President & CEO, Metro-South Chamber of Commerce; Jim O'Connell, National Park Service, Boston Office; John O'Brien, CEO, Cape Cod Chamber of Commerce; George R. Heaton, Jr., Adjunct Professor Management & Social Science, Worcester Polytechnic Institute; Peter Alcock, General Partner, Alcock Ltd. Partners; Richard P. Burke, Director of Public Affairs & Business Policy, Fallon Health Care; Stanley Warner, Professor of Economics Hampshire College; Tim Brennan, Executive Director, Pioneer Valley Regional Planning Commission; Ann Hamilton, President, Franklin County Chamber of Commerce; Roger E. Bolton, William Brough Professor of Economics, Williams College; James W. Zilinski, President & CEO, Berkshire Life Insurance Co., Mike Glazer, Kay-Bee Toys; Max Bazerman, Professor Harvard Business School; Gordon Carr, MassInsight.

Discussion Groups

A series of round table discussion were held between November 26, 2001 and December 7, 2001. Thanks to the following people who took part in these discussion groups:

"Building the Information Infrastructure for the 21st Century": William Biedron, Broadband Content Delivery Forum; Paul Cianelli, New England Cable Television Association; Don Dubendorf, Ginnell, Dubendorf & Smith; William Ennen,

University of Massachusetts Donahue Institute; Michael Goodman, Yankee Group; David Gray, University of Massachusetts; Keith Hampton, Massachusetts Institute of Technology; Bruce Holbein; Massachusetts Software and Internet Council; Peter Howe, The Boston Globe; Tom Hubbard, Massachusetts Technology Collaborative, John Landry, Leaddogs Ventures; William Leahy, AT&T; William Lehr, Internet and Telecommunications Convergence Consortium, Massachusetts Institute of Technology; Michael Lynch, Office of Cable Communications, City of Boston; Thomas Lynch, Worcester Polytechnic Institute; Richard Meyer, Harvard Business School; Katherine Raphaelson, Mass Telecommunications Council; Mark Reilly, AT&T Broadband; Paul Severino, Massachusetts Technology Development Corporation; Joseph Zukowski, Verizon; Sid Topol, Topol Group; and Theresa Polhemus, American Electronics Association.

"Supporting Knowledge Creation and Entrepreneurship": Michael Best, University of Massachusetts Lowell; Daniel Bricklin, Trelix; Paul Conforti, Finale Dessert; Anne Doherty Johnson, AEA New England Council; Michael Donovan, BioSquare; Humera Fasihuddin, Regional Technology Alliance; Cynthia Fisher, Viacell, Inc. and Viacord Inc.; John Friar, Northeastern University; Dennis Guberski, Biomedical Research Models, Inc.; David Hart, John F. Kennedy School of Government, Harvard University; Robert Kispert, Massachusetts Technology Collaborative, Kenneth Morse, Massachusetts Institute of Technology; Kevin O'Sullivan Massachusetts Biomedical Initiatives; Frank Pinto, Massachusetts Technology Development Corporation; Joyce Plotkin, Massachusetts Software and Internet Council; John Preston, Massachusetts Institute of Technology; Kristin Rhyne, Polished, Inc.; William Sahlman, Harvard Business School; Jerome Shaufeld, Mass Ventures; Greg Sheldon, Sheldon Collaborative; Renee Simms, Fleet Development Ventures; Karl Weiss, Massachusetts Technology Collaborative; and Jack Wilson, UMass Online.

"Improving the Outcomes of Government Action": Dulcy Anderson, Center for Women & Enterprise; Allan Blair, Western Massachusetts Economic Development Council; David Blohm, Blohm Group; Gordon Carr, Carr Consulting; Harneen Chernow, AFL-CIO; Charles Chieppo, Shamie Center for Restructuring Government, Pioneer Institute for Public Policy Research; Stephen Crosby, Executive Office of Administration and Finance; John Donahue, John F. Kennedy School of Government, Harvard University; Thomas Grilk, Teradyne; Andrew Hoffman, Boston University; Edward Kunce, Department of Environmental Protection; David Lewis, Information Technology Division; John Regan, Associated Industries of Massachusetts; Robert Rio, Associated Industries of Massachusetts; and Michael Widmer, Massachusetts Taxpayers Foundation.

"Enhancing the Vitality of all Industry Clusters": Dennis Austin, Raytheon Company; Janice Bourque, Massachusetts Biotechnology Council; Fred Breimyer, State Street Corporation; Alan Clayton-Matthews, University of Massachusetts, Boston; Tom Chmura, University of Massachusetts; Alain Hanover, Main Street Partners, Robert Haynes, AFL-CIO of Massachusetts; Marcia Hooper, Advent International Corporation; Fred Hoskins, Northeastern University; Jack King, Division of Employment and Training; Kent Lage, Department of Food and Agriculture; Jay Pieper, Partners Community Health Care, Inc.; John Regan, Associated Industries of Massachusetts; Alison Rimm, Massachusetts General Hospital; Alison Taunton-Rigby, Forester Biotech; Jim Klocke, Greater Boston Chamber of Commerce; and William Wilson, Berkshire Hills Visitors Bureau.

"Preparing the Workforce for the 21st Century": Maura Banta, IBM; Katharine Bradbury, Federal Reserve Bank of Boston; Carole Cowan, Middlesex Community College; Joseph Cronin, Edvisors, Inc.; Christopher Goode, EMC; Charlie Houghton, Massachusetts Coalition of Adult Education; Jennifer James, Commonwealth of Massachusetts; Tripp Jones, MassINC; Fran Kane, Massachusetts Department of Education; Kimberly McLaughlin, Department of Labor and Workforce Development; Neil Mello, MassINC; William Papp, Jr., Prudential Securities; James Peyser, Office of the Governor; Jonathan Raymond, Commonwealth Corporation; Steve Sullivan, Teamsters Local 25; Krishna Vedula, University of Massachusetts Lowell; William Ward, Hampden County Workforce Investment Board; and Tom Webber, Greater Boston Chamber of Commerce.

"Ensuring that the Economic Growth is Compatible with the Community and Environment": Matthew Amorello, MassHighway; Pedro Arce, Metropolitan Area Planning Authority; Rebecca Barnes, Boston Redevelopment Authority; David Begelfer, National Association of Industrial and Office Properties; Linda Benevides, The Strategic Envirotechnology Partnership; Ken Blumberg, EPA New England; John DeVillars, Brownfield Recovery Corporation; Margo Fenn, Cape Cod Commission; David Forsberg, Worcester Business Development Corporation; Oliver Gillham, Boston Society of Architects; Brian Gilmore, Associated Industries of Massachusetts; Bill Guenther, MassInsight; Bennet Heart, Conservation Law Foundation; Bill Nigreen, New Profit, Inc.; Linda Patrella, Springfield Planning Department; Catherine Ratte Miller, Pioneer Valley Planning Commission; Gary Ruping, Ruping Builders; Bill Shutkin, Massachusetts Institute of Technology; David Soule, Metropolitan Area Planning Commission; Don Walsh, NSTAR;

and Alison Walsh, EPA New England.

Regional Forums

A series of seven regional meetings took place across the state from September 25, 2001 to November 28, 2001. Thank you to all of the facilitators, faculty support staff and recorders whose contributions to these events made them a success.

Special thanks to the team from the UMass Donahue Institute that professionally facilitated the break-out sessions at each of the regional meetings: Elizabeth McCarthy, Kenneth Grooms, Carole Kasper, Paul Botticello, Julie Bernardin, Jody Hensley, Christine Karavites, Kate Hayes and Megan Budds.

Northeast Regional Forum: September 25, 2001
Special thanks to the University of Massachusetts Lowell for hosting this event in particular: Dr. William T. Hogan, Chancellor; and Dr. Lou Petrovic, Director of External Funding, Technology Transfer and Partnering.

Bruce Akashian, Merrimack Valley Regional Skills; Martin Anenberg, University of Massachusetts Lowell Research Foundation; Peter Aucella, Lowell National Historical Park; Ann Barton, City of Lowell; Joseph Bevilacqua, Merrimack Valley Chamber of Commerce; Jan Binda, Sun Microsystems, Inc.; Clarissa Brown, Division of Employment & Training; William J. Buckley, City of Methuen; Gaylord Burke, Merrimack Valley Planning Commission; Judith Burke, Middlesex Community College; Judy Butler, Office of the Governor; Sally Cerasuolo, Greater Haverhill Chamber of Commerce; Sokhary Chau, Specialized Capital Consulting; Tom Chmura, University of Massachusetts; Norman Claeys, Massachusetts Division of Employment & Training; J. Matthew Coggins, City of Lowell; Nancy Colbert, City of Newburyport; Joe Corcoran, Small Business Development Center, Salem State College; Jonathan Corso, Merrimack Valley Planning Commission; Norca Disla-Shannon, Commonwealth Corp.; Eric Dubin, Keyspan Energy; Frances Eagle, Merrimack Valley Manufacturing Partnership, Inc.; James Fallon, Tyco Electronics; Mike Galligan, MassDevelopment; Thomas Galligani, City of Lowell-Division of Planning; Robert Halpin, Merrimack Valley Economic Development Council, Inc.; Robert Hatem, Northern Essex Community College; Walter Hopkins, Community Action, Inc.; Carenmarie Houle, MassExcellence; Pamela Jahngen-Provencal, University of Massachusetts Lowell; Doug Kehlhem, Massachusetts Alliance for Economic Development; Catherine Kendrick, University of Massachusetts Lowell; Samkhann Khoeun, Cambodian Mutual Assistance Association of Greater Lowell, Inc.; David Kronberg, Greater Lowell Community Foundation; Robin Leal, Town of Georgetown; Bill Linnehan, Career Center of Lowell; Henri Marchand, Lowell Plan Inc.; Carlos Matos, NECC/3rd Tier Cities; Patty McCloy, Greater Merrimack Valley Visitor's Bureau; Michael McQuaid, Career Center of Lowell; Maria Miles, Salisbury Chamber of Commerce; Jacqueline Moloney, University Of Massachusetts Lowell; Jim Neary, MassExcellence; Jeanne Osborn, The Billerica Plan; Peou Ouch, Asian-American Business Association; Kenneth Owens, Massachusetts House of Representatives; Steven C. Panagiotakos, Massachusetts State Senate; William Papp, Prudential Securities; Lisa Pearson, Town of Salisbury; Jay Petri, Enterprise Bank; William Piercey, Greater Newburyport Chamber of Commerce; Janice Pokorski, Cambodian Mutual Assistance Association of Greater Lowell, Inc.; Henry Przydzial, Greater Lowell Regional Employment Board; John Regan, Associated Industries of Massachusetts; Kathy Rodger, Northern Essex Community College; Shaw Rosen, Lower Merrimack Valley Workforce Investment Board; Becky Rulland, Billerica Chamber of Commerce; Steve Sadwick, Town of Tewksbury; Karen Sawyer, MassDevelopment; Jim Scully, Holy Family Hospital; David Sullivan, State Workforce Investment Board; David Tibbetts, Merrimack Valley Economic Development Council; Paul E. Tirone, Massachusetts House of Representatives; Vincent Un, Asian-American Business Association; Krishna Vedula, University of Massachusetts Lowell; Arthur Williams, Greater Lowell Chamber of Commerce; Leonard A. Wilson, First Essex Bancorp, Inc.; and Frederick Young, Small Business Development Center – Salem State College.

Pioneer Valley Regional Forum: October 15, 2001
Special thanks to the University of Massachusetts Amherst for hosting this event in particular: Dr. Marcellette Williams, Chancellor; Dr. Fred Byron, Vice Chancellor; and Jaymie Chernoff, Director of Economic Development.

Teri Anderson, City of Northampton Mayor's Office; Jessica Atwood, Franklin Regional Council of Governments; Andrew Baker, Shelburne Falls Area Business Association; Allan W. Blair, Economic Development Council of Western Massachusetts; Mike Bosworth, University of Massachusetts; Ed Bourgeois, Bay Road Corriedales; Susan Bowles, UMass Amherst; Steven Bradley, Baystate Health Systems; Timothy W. Brennan, Pioneer Valley Planning Commission; Rick Brighenti, Massachusetts Manufacturing Extension Partnership; Ann Burke, Small Business Development Center - EDC; Priscilla Canniff, Town of Greenfield; Ralph Carlson, Economic Development Council of Western Massachusetts; Valerie Conti, UMass Amherst; John Coull, Amherst Area Chamber of Commerce; Liz Councilman,

UMass Amherst; Steven Coyne, Massachusetts Manufacturing Extension Partnership; Roberta Crosbie, Town of Hadley; Patricia Crosby, Franklin Hampshire Regional Employment Board; Michael Daly, Baystate Health Systems; Glenn Davis, Urban League of Springfield; Dianne Fuller Doherty, Office of the Governor, Paul Doherty, Doherty, Pillsbury, Wallace and Murphy, P.C.; Linda Dunlavy, Franklin Region Council of Governments; Humera Fasihuddin, Regional Technology Alliance; Martha Field, Greenfield Community College; Anna Garbiel, Franklin Regional Council of Governments; Michael Garjian, Valley CDC; Nancy Goff, Town of Greenfield; Joseph Goldstein, UMass Amherst; William Gorth, National Evaluation Systems, Inc.; Steven Graham, Toner Plastics; John Griffin, Town of Palmer; Ann Hamilton, Franklin County Chamber of Commerce; William Hanley, Millitech Corporation; Jeff Hayden, City of Holyoke; Thomas Herrick; Tom Holland, Springfield Technical Community College; John Hoops, National Tooling & Machinist Association; David Howland, Department of Environmental Protection; Doug Kehlhem, Massachusetts Alliance for Economic Development; Adam Laipson, Franklin Regional Planning Board; Trish Manfredi, UMass Amherst; Patricia Marcus; UMass Amherst, Ernest May, UMass Amherst; Michael McCusker, McCusker's Market & Deli; James Mead, ProSensing Inc.; John Mullin, UMass Amherst; Joe Nickerson, Pro Pel Plastech; Keith Parent, Court Square Data; Georgianna Parkin, University of Massachusetts Amherst; Anthony Pellegrino, Holyoke Community College; Peter Picknelly, Peter Pan Buslines-Monarch Place; W. Lowell Putnam, Video Communications Inc.; Robert Pyers, Economic Development Partners; John Remzi, Graphic Impact; Michael Robinson, Massachusetts Small Business Development Center Network; Barbara Roche, Regional Education and Business Alliance; Donna Ross, Baystate Health Systems; Tim Roughan, Massachusetts Electric; Susan Rutherford, Quaboag Valley CDC; Jerome Schaufeld, Mass Ventures; Paul Shuldiner, UMass Transportation Center; Peggy Sloan, Franklin City Regional Council of Governments; Steven Solomon, Telitcom; Robert Staudinger, Jarvis Caster Group; Steven Sullivan, Teamsters Local #25; Paul Tangredy, Western Massachusetts Electric Company; Christine Turner, UMass Amherst; Carlos Vega, Nueva Esperanza; Marie Waechter, Musicorda Organization; John Waite, Franklin County Community Development Corporation; Pamela A. Wolanske, Associate Industries of Massachusetts; Peter Wood, Associated Builders Inc. and Michael D. Wright, UMass Amherst.

Cape and Islands Forum: October 29, 2001

Special thanks to the Cape Cod Community College for hosting this event in particular: Robert Ross, Vice President and Dick Rand, Associate Dean for Workforce Education.

Thank you to the participants including: Kenneth G. Ainsworth, Eastham Long Range Planning; David Augustinho, Cape and Islands Workforce Investment Board; Paula Bacon, Bacon Tours; David R. Borges, University of Massachusetts Dartmouth; Brian Braginton-Smith, The Conservation Consortium; John Burns, Lower Cape Cod Community Development Corporation; John K. Bullard, UMass Dartmouth; Bonnie Coughlin, Verizon; Eugene R. Curry, Cape Cod Technology Council; Joellen J. Daley, Town of Barnstable; Daniel Dray, Cape Cod Economic Development Council; Norman Edinberg, Lower Cape Cod Community Development Corporation; Melinda Gallant, Mashpee Commons; Elizabeth Gawron, Community Foundation of Cape Cod; Maggie Geist, Association for the Preservation of Cape Cod; Karen Greene, Town of Yarmouth; Stephanie Henderson, Lower Cape Outreach Council; Kyle Hinkle, Orleans Chamber of Commerce; Andrew Kamarck, Cape Cod Economic Development Council; David Knight, Falmouth Chamber of Commerce; Lance Lambros, Barnstable County Commissioner; Dan Lilly, Massachusetts Small Business Development Corporation; Jeffrey Luce, NSTAR; Jeannine Marshall, Cape & Islands Community Development; Maggie Merrill, Marine & Oceanographic Technology Network; Gail Meyers Sharman, Suffolk University Cape Cod; Spyro Mitrokostas, Cape Cod Technology Council, Inc.; Susan Mueller, Cape Cod Times; Clare O'Brien, Cape Cod Chamber of Commerce; John O'Brien, Cape Cod Chamber of Commerce; John D. Pagini, Nantucket Planning & Economic Development Commission; Matthew Patrick, Massachusetts House of Representatives; Stefanie Picard, University of Massachusetts Dartmouth; Frederic B. Presbrey, Housing Assistance Corporation; Rosemary Presnar, Massachusetts Manufacturing Extension Partnership; Mike Prior, Massachusetts Manufacturing Extension Partnership; Ruth W. Provost, Massachusetts House of Representatives; Jeffrey Putnam, Log Cabin Farm; Richard Rand, Cape Cod Community College; Roger Rec, Mansfield Cooperative Bank; Robert Rogers, Ewing Marion Kauffman Foundation; Robert G. Ross, Cape Cod Community College; Timothy Sadler, IntraMedia; Mark Simonitsch, Commercial Fish Pier; Tony Vieira, University of Massachusetts Dartmouth; Gay Wells, Cape Cod Commission; Phyllis Whitney, ACCCESS/Cape Cod Community College; and Steve Withrow, ORE Offshore/Accusonic Technologie.

Central Forum: November 9, 2001

Special thanks to the University of Massachusetts Worcester for hosting this event in particular: Dr. Aaron Lazare, Chancellor; and Richard Stanton, Vice Chancellor.

Thank you to the participants including: Lee Adams, Department of Environmental Protection; Peter Alcock, Fitchburg State College; Trevor Beauregard, Town of Leominster; David B. Begelfer, National Association of Industrial and Office Properties; Kristen Burke, I-495 Technology Corridor Initiative; Mark J. Carron, Massachusetts House of Representatives; Carol Cedrone Brennan, Massachusetts Technology Development Corporation; Russell Connor, Town of Grafton; Alfred James Cotton, Nypro, Inc.; Toni Coyne Hall, Massachusetts Department of Housing & Community Development; Henry Danis, Town of Westborough; Peter Fellenz, Worcester Community Housing Resources; John Gallivan, Office of Representative James Leary; James C. Garvey, Flagship Bank & Trust Company; Patricia Gittes, East Side Community Development Corporation; Melvin P. Gordon, Town of Shrewsbury; William Grant, Central Massachusetts Regional Planning Commission; Marty Green, Blackstone Valley Chamber of Commerce; Jim Gusha, Massachusetts Manufacturing Extension Partnership; Michael Hale, Town of Shrewsbury; Phil Hammond, Cullinan Engineering; Gordon Hargrove, Friendly House, Inc.; James Hayes, Worcester Regional Chamber of Commerce; John J. Healy, Massachusetts Manufacturing Extension Partnership; Jeannie Hebert, Hebert Candies, Inc.; Michael Holbrook, Small Business Development Center; Susan Houston, Massachusetts Alliance for Economic Development; Robert Hubbard, City of Gardner; Donna Jacobs, Framingham Planning & Economic Development; Julie Jacobson, Worcester Regional Chamber of Commerce; Christian Jacqz, Executive Office of Environmental Affairs; Jeffrey A. Kozlowski, Office Representative Paul K. Frost; Bob Lacey, University of Massachusetts; Michael Lanava, Fitchburg Industrial Development Commission; Stephen LeDuc, Massachusetts House of Representatives; Mark Love, Worcester Regional Chamber of Commerce; Barbara Macaulay, UMass I-495 Center for Professional. Education; James Matthews, Worcester Polytechnic Institute; Paul F. Matthews, Worcester Regional Chamber of Commerce; William Mauro, City of Marlborough; Gail McGrail, Town of Grafton; Rita Moran, Massachusetts Electric; Daniel Morgado, Town of Shrewsbury; Jill Myers, Town of Northborough; William Newton, Central Massachusetts Regional Planning Commission; Paul Novak, Home Builders Association of Massachusetts; Claire M. O'Neill, MassDevelopment; Kevin O'Sullivan, Massachusetts Biomedical Initiative; Jack Perreault, Town of Shrewsbury; George N. Peterson, Massachusetts House of Representatives; Britte Pettazzoni, Office of Representative Susan W. Pope; Karyn E. Polito, Massachusetts House of Representatives; Jean Poteete, Tufts Biotech Corp.; Michael Rivard, Fitchburg State College; Jim Robbins, Town of Westborough; Gladys Rodriguez-Parker, Office of Congressman James P. McGovern; Nancy Sala, Massachusetts Electric Company; Tim Sappington, North Central Massachusetts Regional Employment Board; William Scanlan, Central Massachusetts Regional Planning Commission; Roberta Schaefer, Worcester Municipal Research Bureau; Todd Shimkus, North Central Chamber of Commerce; Rick Stanton, University of Massachusetts Worcester; Bill Stares, Waters Corporation; Robert L. Thomas, Martin Luther King, Jr. Business Empowerment Center; Cliff VanReed, Town of Douglas; and Mark Waxler, Beechwood Hotel.

Southeastern Regional Forum: *November 16, 2001*

Special thanks to University of Massachusetts Dartmouth for hosting this event in particular: Jean MacCormack, Chancellor; and Paul Vigeant, Assistant Chancellor for Economic Development.

Stephen P. Andrade, Bridgewater State College; Dennis G. Austin, Raytheon Company; Benjamin Barrett, Office of Senator Joan Menard; Cheryl Belknap, New Bedford Oceanarium; David R. Borges, UMass Dartmouth; John K. Bullard, UMass Dartmouth; Larry Cameron, MassDevelopment; James E. Carroll, Rex Cut Products, Inc.; Jeffrey Collins, Joint Committee on Commerce & Labor; Sandy Conaty, Town of Seekonk; Leonard Coriaty, Greater New Bedford REB; Scott Costa, Bufftree Building Company Inc.; Bonnie Coughlin, Verizon; Alan Coutinho, Town of Acushnet; Thomas Curry, UMass Dartmouth; Harold Davis, Town of Plymouth; Victor DeSantis, Bridgewater State College; Ralph Dlouhy, New Bedford Public Schools; Brian Donnelly, CareerWorks; Michael Esmond, Massachusetts Alliance for Economic Development; Ken Fiola, Fall River Office of Economic Development; Don Foster, UMass Dartmouth; June Goguen, FirstFed; Dawn Henderson, Executive Office of Environmental Affairs; Edward Iacaponi, Town of Dartmouth; Larry Koff, Larry Koff & Associates; Susan Lane, UMass Dartmouth; Dan Lilly, Massachusetts Small Business Development Corporation; Annemarie Loftis, Massachusetts Electric; Robert J. Luongo, New Bedford Economic Development Council; Thomas Lyons, New Bedford Economic Development Council; Louis Martin, Department of Housing & Community Development; Sheila Martines Pina, Bristol County Convention & Visitors Bureau; James Mathes, New Bedford Area Chamber of Commerce; Ronald McNeil, UMass Dartmouth; John J. McSweeney, Fall River Five Cents Savings Bank; Jennifer Menard, UMass Dartmouth; Joan M. Menard, Massachusetts State Senate; Roy Nascimento, Metro South Chamber of Commerce; Terry Nowell, Massachusetts State Senate; James Oliveira, Lifestream, Inc.; Richard Oliveira , O Journal; Elizabeth Palter, Bristol Community College; Georgianna Parkin, Small Business Development Center Network; Salvador Pina, Brockton

Workforce Investment Board; Stefanie Picard, UMass Dartmouth; Rosemary Presnal, Massachusetts Manufacturing Extension Partnership; Mike Prior, Massachusetts Manufacturing Extension Partnership; Michael J. Rodrigues, Massachusetts House of Representatives; William Roth, Town of Fairhaven; Anthony Sapienza, Riverside Manufacturing Corp.; Richard L. Shafer, City of Taunton; Robin Smith, Bristol Community College; Stephen Smith, Southeastern Regional Planning & Economic Development District; Tobias Stapleton, International Trade Assistance Center; Dwight S. Stimson, Hostar Marine Transport System; David B. Sullivan, Massachusetts House of Representatives; Donald Sullivan, Southeastern Regional Planning & Economic Development; Jim Sullivan, Small Business Development Center; Michael P. Sullivan, Massachusetts Small Business Development Center; Robert Sullivan, Tucker Anthony, Inc.; Shawna Sweeney, UMASS Dartmouth; Michael Taylor, Maritime International, Inc.; David Tibbetts, Merrimack Valley Economic Development Council; Donna Vandini, Days Inn Middleboro; Tony Vieira, UMASS Dartmouth; Donald Walsh, NSTAR; Stewart P. Washburn, Management Consultant; and David Wojnar, Town of Acushnet.

Berkshire Forum: *November 20, 2001*

Special thanks to Berkshire Community College for hosting this event in particular: Barbara Viniar, President.

Thank you to the participants including: Thomas Aceto, Mass College of Liberal Arts; Douglass Ball, Lenox Savings Bank; Dona Beck; FirstMass; David R. Bissaillon, Berkshire Chamber of Commerce; Bill Carey, Berkshire Eagle; Patrick A. Carnevale, Governor's Office; Edward A. Chagnon, Bardwell Bowlby & Karam Insurance; Claudine Chavanne, Workforce Development Consultant; Stephen M. Coyne, Massachusetts Manufacturing Extension Partnership; Ann W. Dobrowolski, City of Pittsfield; Chuck Dooley, Western Massachusetts Electric Company; Paul Dowd, Western Massachusetts Electric Company; Donald R. Dubendorf, Grinnell, Dubendorf & Smith LLP; Henry Ervin, Pittsfield Cooperative Bank; Michael Esmond, Massachusetts Alliance for Economic Development; Steve Fogel, Berkshire Enterprises/BCC; Peter Fohlin, Town of Williamstown; Tim Geller, Southern Berkshire Housing Coalition; Keith E. Girouard, Community Development Corporation of South Berkshire; Rosemary Jette, Jette Communications; Cynthia Kadel, Sunshine Ventures Computer Consulting; David L. Kalib, Berkshire Life Insurance Co. of America; Nathaniel Karns, Berkshire County Regional Planning Commission; Ellen Kennedy, Massachusetts College of Liberal Arts; Mary Kozik, Office of Representative Peter Larkin; Scott Latvalla, Steinerfilm Inc.; Lisa Leary, Eastover Resort, Inc.; Vincent Lee, Otis Planning Board; Alan Marden, City of North Adams;; Douglas McNally, Taconic High School; Ann Mintz, Berkshire Museum; Susan Mongue, Massachusetts Small Business Development Center; Monica Montferret, Town of Hinsdale; Gerry Murray, KB Toys; Michael Murray, Hi-Tech Mold & Tool; Mary Nash; Kathy Orlando, Sheffield Land Trust; Helen Ouellette, Williams College; Nancy Ovitsky, Massachusetts College of Liberal Arts; John Renzi, Graphic Impact Signs, Inc.; Richard Rilla, Berkshire Plastics Network; Susan Sauve, Shakespeare and Company; Vicky Singer, Berkshire Enterprises; Ray Smith, Berkshire Visitors Bureau; Suzanne Stinson, Northern Berkshire Health Systems/North Adams Regional Hospital; Bradley C. Svrluga, Berkshire Capital Investors; Robert B. Trask, Country Curtains; Richard Vinette, Lee Community Development Corporation; William R. Wilson, Berkshire Visitors Bureau; and Ticki Winsor, Eastover Resort, Inc.

Greater Boston Forum: *November 28, 2001*

Special thanks to the University of Massachusetts Boston for hosting this event in particular: Dr. Jo Ann Gora, Chancellor; and John Ciccarelli, Assistant to the Chancellor for Economic Development.

Thank you to the participants including: Dana Ansel, MassINC.; Pedro Arce, Economic Development Planner; Jay Ash, City of Chelsea; Arthur Atkins, State Office of Minority, Women and Business Assistance; David Bancroft, MassDevelopment; Thomas J. Barry, Mass Business Development; Corporation; Elmer Bartels, Massachusetts Rehabilitation Commission; Beate Becker, Creative Economy Initiative; Milton Benjamin, Massachusetts Community Development Finance Corporation; Deborah D. Blumer, Massachusetts House of Representatives; Deborah Boisvert, University of Massachusetts Boston; Frederick Breimyer, State Street Corporation; Nancy Brown, Metro North Regional Employment Board; Laura Canter, MassDevelopment; Jennifer Capuano, Chelsea Center Recycling & Economic Development; Anthony Caruso, Caruso Enterprises; Thomas Chmura, University of Massachusetts; Philip Conroy, Mount Ida College; Joy Conway, Greater Boston Real Estate Board; Toni Coyne Hall, Massachusetts Department of Housing & Community Development; Daniel Daly, Daly & Company, Inc.; Michael Dimino, Chelsea Center for Recycling & Economic Development; Kris Erickson, Mystic Valley Development Commission/TeleCom City; Richard Foley, Sarnafil Inc.; Christopher A. Fox, MassINC; Katherine Galaitsis, University of Massachusetts Boston CCDE; Susan Gately, Massachusetts College of Art; Lisa Gaudette, 128 Business Council; Michael Grace, City of Boston; Paul Halkiotis, Town of Weymouth; Susan Hannon, Boston Redevelopment Authority; Antonio Harris, Massachusetts Rehabilitation Commission; Michael P. Hogan, MassDevelopment; Bruce E.

Holbein, Massachusetts Software & Internet Council; Susan Houston, Massachusetts Alliance for Economic Development; Mike Kalfopoulos, Massachusetts Manufacturing Extension Partnership; Chris Kealy, MassDevelopment; Mary Kelley, Massachusetts Cultural Council; Thomas Kershaw, Massachusetts Visitors Industry Council; Soosie Lazenby, Mass Sports Partnership; David Lewis, Commonwealth of Massachusetts; Alan Macdonald, Massachusetts Business Roundtable; Elaine Madden, City of Cambridge; Julie McConchie, North of Boston Convention & Visitors Bureau; John McKiernan, SBDC Boston College; Aracelis Mercardo, Boston Redevelopment Authority; Randall Moore, Northeastern University; William Nigreen, Arts & Business Council of Greater Boston; Joseph O'Garro, Massachusetts Business Development Corporation; John O'Keefe, Massachusetts Highway Department; James A. Owens, National Capital Resources; Amy Perlmutter, Chelsea Center Recycling & Economic Development; Finley Perry, Builders Association of Greater Boston; David Polatin, Small Business Association; Jeff Ritter, Town of Wayland; Joseph Rivers, SBDC University of Massachusetts; Maureen Rogers, Neponset Valley Chamber of Commerce; Luis Rosero, Boston Redevelopment Authority; Beth Siegel, Mt. Auburn Associates; Katherine H. Sloan, Massachusetts College of Art; Margaret Somer, Small Business Development Center - University of Massachusetts; David Soule, Metropolitan Area Planning Council; Donald Steinbrecher, Massachusetts Telecommunications Council; Mark S. Sternman, Office of U.S. Senator Kerry; Karen Sutherland, Small Business Development Center, University of Massachusetts; John Sutich, Massachusetts Business Roundtable; Jo-An Thomas, Advanced Center for Technology & Training; Jo Anne Thompson, State Office of Minority and Women Business Assistance; Joseph P. Walsh, City of Salem; Les Warren, Bunker Hill Community College; and Joseph Zukowski, Verizon.

References

This section identifies resources consulted in the development of *Toward a New Prosperity: Building Regional Competitiveness Across the Commonwealth.* These reference materials are in addition to those identified in footnotes. This section also identifies data sources used to develop charts and tables throughout the document.

Support All Industry Clusters

Backing into Clusters: Retrofitting Public Policies
Stuart A. Rosenfeld, Integration Pressures: Lessons from Around the World
John F. Kennedy School Symposium, Harvard University, March 29-30, 2001

"Clusters and Competition: New Agendas for Companies, Governments and Institutions"
Michael Porter
In *On Competition*, Harvard Business School Press, 1998

Clusters of Innovation: Regional Foundations of U.S. Competitiveness
Michael E. Porter, Monitor Group and on the FRONTIER Council on Competitiveness, 2002

The Creative Economy Initiative: The Role of Arts and Culture in New England's Economic Competitiveness
The New England Council, June 2000

Economic Impact of the Pharmaceutical Industry of Massachusetts
Dr. Anurag Sharma
Eugene M. Isenberg School of Management University of Massachusetts, 1999

Economic Impacts of the Textile and Apparel Industries in Massachusetts
Dr. Clyde W. Barrow
University of Massachusetts Donahue Institute, 2000

The Medical Device Industry in Massachusetts
Alan Clayton-Matthews
Massachusetts Medical Device Industry Council, 2001

The Massachusetts Environmental Industry: Facing the Challenges of Maturity
Erick Cooke, Betty J. Diener, David Terkla
University of Massachusetts Donahue Institute, October 2000

The Massachusetts Marine Economy
Daniel Georgianna
University of Massachusetts Dartmouth, September, 2000

Massachusetts Travel Industry Report: 2002 Statewide and Regional Economic Impact and Visitor Behavior
Massachusetts Office of Travel & Tourism, May 2002

State Competitiveness Report 2001
Beacon Hill Institute for Public Policy Research at Suffolk University, 2001

U.S. Travel and Tourism Satellite Accounts for 1996 and 1997
David I. Kass and Sumiye Okubo, from *Survey of Current Business,* July 2000

Support Entrepreneurship and Innovation

Analyses of Impact of Federal R&D Investment Scenarios on Economic Growth
Massachusetts Technology Collaborative, August 2000

Building Entrepreneurial Networks
National Commission on Entrepreneurship, December 2001

Building Technology Networks for Regional Economic Competitiveness
Technology Partnership Practice, Battelle Memorial Institute, February 2001

Capital Access Programs: A Summary of Nationwide Performance
Department of Treasury, January 2001

Expanding the Links Between Business and Higher Education: A Call to Action
MassInsight Corporation, Fifth Annual Business Expansion Report, Fall 2000

High Growth Companies: Mapping America's Entrepreneurial Landscape
National Commission on Entrepreneurship, July 2001

Knowledge-Value Cities in the Digital Age
Ross C. DeVol and Joel Kotkin
Milken Institute, February 13, 2001

Maintaining the Innovation Edge: The Case for Creating a Massachusetts Science and Technology Strategy
Robert G. Kispert
Massachusetts Technology Collaborative, August 2001

MIT: The Impact of Innovation
Bank of Boston and Massachusetts Institute of Technology, March 1997

Navigating Through Regulations and Licensing Requirements: A Guide for Entrepreneurs in Boston in 12 Occupations
Center for Urban Entrepreneurship, Pioneer Institute for Public Policy Research, 2002

Nurturing Entrepreneurial Growth in State Economies
Scott Palladino and Thom Rubin
National Governors Association, 2000

Proposal to Create a Massachusetts Federal and State Technology Partnership
Massachusetts Technology Collaborative, 2001

Signs of Life: The Growth of Biotechnology Centers in the U.S.
Joseph Cortright and Heike Mayer
The Brookings Institution Center on Urban and Metropolitan Policy, 2002

State Governments: Partners in Innovation
Christopher M. Coburn and Duncan M. Brown
In *Investing in Innovation: Creating a Research and Innovation Policy That Works*, ed. by Lewis M. Branscomb & James H. Keller MIT Press, 1997

Prepare the Workforce of the 21st Century

Building a Workforce for the Information Economy
National Academy of Sciences
National Research Council, 2001

The Changing Workforce: Immigrants in the New Economy in Massachusetts
W. Neal Fogg and Andrew M. Sum
Citizens Bank, Mass INC, and Northeastern University Center for Labor Market Studies, November 1999

Climbing the Ladder: Expanding Opportunity Through Training
Governor's Task Force to Reform Adult Education and Worker Training, Recommendations of the Task Force, July 2001

A Comprehensive Look at State-Funded, Employer-Focused Job Training Programs
National Governors' Association Center for Best Practices, 1999

Immigration's Impact on the Commonwealth
Robert A. Nakosteen and Andrew Sum
Massachusetts Benchmarks, Spring 2001

"Labor Squeeze: New England's Prospects Hinge on the Supply of Scientific, Engineering and Information Technology Workers"
Neeta P. Fogg and Paul E. Harrington
In *Connection: New England's Journal of Higher Education and Economic Development*, Fall 2000

Massachusetts Employment Projections through 2008: A Focus on the Jobs, the Industries, and the Workforce
Division of Employment and Training Economic Analysis Department, 2000

Threats to Sustained Economic Growth: Science, Engineering and Information Technology Labor Shortages in the Massachusetts Economy
Neeta P. Fogg and Paul E. Harrington
Northeastern University Center for Labor Market Studies, September 2000

Why People Move: Exploring the March 2000 Current Population Survey
U.S. Census Bureau, March 1999 to March 2000

Build the Information Infrastructure of the 21st Century

Berkshire Connect: Assessment and Recommendations Report
Massachusetts Technology Collaborative, July 1998

Cape Cod Connect: Cape Cod Telecommunications Infrastructure Results from the Survey of Cape Cod Businesses
Dr. Zenia Kotval
Cape Cod Connect, February 2, 2001

Deployment of Advanced Telecommunications Capability
Federal Communications Commission, Washington, DC
Second Report, August, 2000
Third Report, February 2002

The Dynamics of Community-Based Economic Development: State Science and Technology Indicators, Second Edition
Office of Technology Policy, U.S. Department of Commerce, October 2001

LinkMichigan Report
Michigan Economic Development Corporation, May 2001

Mass Broadband: A Broadband Roadmap for Massachusetts
Massachusetts Technology Collaborative and the Massachusetts Software and Internet Council, 2002

Moving Towards Broadband Ubiquity in U.S. Business Markets
Ernie Bergstrom, Kneko Burney, Mark Kirstein, and Mike Paxton
Cahners In-Stat Group, 2001

Report of the Wireless Steering Committee
Massachusetts Office of Consumer Affairs and Business Regulation, September 2002

Telecommuting: Overview of Potential Barriers Facing Employers
United States General Accounting Office, July 2001

Ensure that Economic Growth is Compatible with Community and Environment

Growing Pains: Quality of Life in the New Economy
Joel S. Hirschhorn
National Governor's Association, 2000

How We Live: A Civic Initiative for a Livable New England
Boston Society of Architects, September 7, 2000

Losing Ground: An Analysis of Recent Rates and Patterns of Development and Their Effects on Open Space in Massachusetts
Jennifer Steel
Massachusetts Audubon Society, May 1999

New Community Design to the Rescue: Fulfilling Another American Dream
Joel S. Hirschhorn and Paul Souza
National Governors Association, 2001

Policy Report: Reconstructing Massachusetts
Policy Report Series, #2
Executive Office for Administration and Finance, January 2000

Report of The Governor's Special Commission on Barriers to Housing Development
January, 2002

Smart Growth in Maryland
State of Maryland, July 2001

The State of Our Environment
Commonwealth of Massachusetts Executive Office of Environmental Affairs, 2000 and update, 2001

STEP: Massachusetts Strategic Envirotechnology Partnership
2000-2001 Annual Report

Where Do We Grow From form Here? In the Fast Lane: Delivering More Transportation Choices to Break Gridlock
National Governors Association, 2000

Where do We Grow From Here? New Mission for Brownfields: Attacking Sprawl by Revitalizing Older Communities
National Governors Association, 2000

Who Sprawls Most? How Growth Patterns Differ Across the US
William Fulton, Alicia Harrison, Mai Nguyen, and Rolf Pendall
Brookings Institution Press Survey Series, 2001

Why are there NIMBY's?
William A. Fischel
Dartmouth College, January 2000

Improve the Outcomes of Government Action

Benchmark of Economic Development Resources in Selected U.S. States
Massachusetts Technology Collaborative and Tier Technologies, January 2002

Commonwealth of Massachusetts Information Technology Annual Report: Fiscal Year 2001
Information Technology Bulletin – A Special Edition
Commonwealth of Massachusetts, Summer 2001

The Government We Choose: Lean, Focused, and Affordable
Governor Weld and Lieutenant Governor Cellucci's Plan for Downsizing Massachusetts Government, November 1995

Massachusetts Health Care Trends: 1990 – 1999
Massachusetts Division of Health Care Policy, October 2000

Operating the MWRA through a Public/Private Partnership
Policy Brief Series # 6
Massachusetts Executive Office for Administration and Finance, March, 2000

"Putting Citizens On-Line, Not In Line"
Gassan Al-Kibsi, Kito de Boer, Mona Mourshed, and Nigel P. Rea from The McKinsey Quarterly, #2, 2001

Review of Studies of the Economic Impact of the September 11, 2001 Terrorist Attacks on the World Trade Center
General Accounting Office, May 2002

"Rules Versus Discretion: The Productivity Consequences of Flexible Regulation"
Sumit K. Majumdar and Alfred A. Marcus
In *Academy of Management Journal,* Volume 44, 2001

State Budget '02: Heading for A Crash
Massachusetts Taxpayers Foundation, January 2002

"Unemployment Insurance Policy in New England: Background and Issues"
Robert Tannenwald and Christopher J. O'Leary from *New England Economic Review,* May/June 1997

"Update on the Financial Picture of the Massachusetts Unemployment Insurance Program"
Massachusetts Division of Employment and Training, December 2001

You Can't Enlarge the Pie: Leading Experts on Decision Making Show How to Apply "Wise Tradeoffs" to Political Negotiation
Max Bazerman, Jonathan Baron, and Katherine Shonk
Basic Books, 2001

Studies of Massachusetts

Choosing to Compete: A Statewide Strategy for Job Creation and Economic Growth
The Executive Office of Economic Affairs and the University of Massachusetts, May 1993

The Competitive Advantage of Massachusetts
Michael Porter and Monitor Company, Inc., 1991

Competitive Imperatives for the Commonwealth
Phil Auerswald, Steven Feinson, Finbar Livesey, and Josh Glickman
Massachusetts Department of Economic Development, September 2001

Ensuring Continued Growth and Prosperity in the New Economy: An Action Report for the Commonwealth
The Governor's Economic Development Council, December 2000

Made in Massachusetts: Competitive Manufacturing in a High-Skill Location
Mass Insight Corporation, Fall 1999

Massachusetts Benchmarks: The Quarterly Review of Economic News and Insight
Published by the University of Massachusetts, in cooperation with the Federal Reserve Bank of Boston

"The Massachusetts Knowledge Sector: A Regional Perspective"
Michael Goodman and Robert Nakosteen from *Massachusetts Benchmarks,* Spring 2002

The Road Ahead: Emerging Threats to Workers, Families and the Massachusetts Economy
Anwity Bahuguna, Neeta P. Fogg, W. Neal Fogg, Paul Harrington, Sheila Palma, Andrew M. Sum, and W.Paul Suozzo
Theresa and H. John Heinz III Foundation and MassINC, December 1998

System Integration, Regional Innovation and the Resurgence of American Industry
Michael Best
Center for International Business and Management, University of Cambridge, July 1999

The State of American Dream in Massachusetts, 2002
Center for Labor Market Studies and MassInc, May 2002

Toward the Next Massachusetts Miracle: The Limits of Economic Development Programs
Edwin S. Mills
Pioneer Institute for Public Policy Research, 1997

Selected Regional Studies

Greater Boston

Comprehensive Economic Development Strategy 2002
Metropolitan Area Planning Council, June 2002

A Decade of Change: Growth Trends in the Greater Boston Area – 1990 to 2000
Metropolitan Area Planning Council, 2001

Governing Greater Boston: The Politics and Policy of Place
Edited by Charles C. Euchner
The Press at the Rappaport Institute for Greater Boston, John F. Kennedy School of Government, Harvard University. 2002

Greater Boston's Leading Industries: Drivers of the Regional Economy
Greater Boston Chamber of Commerce, 2001

Logan International Airport's Evolving role in the New England Economy
Economic Development Research Group, December 2001

Northeast

Economic Development Strategy for the Merrimack Valley
Merrimack Valley Planning Commission, May 2001

Southeast

Building Partnerships for Economic Development in Southeastern Masssachusetts:
Comprehensive Economic Development Strategy
Southeastern Regional Planning and Economic District, June 2001

Mission Statement and Objectives of Vision 2020: A Partnership for Southeastern Massachusetts
Vision 2020 Task Force, December 2001

Regional Policy Plan: A guide for Shaping our Communities and the OCPC Region
Old Colony Planning Council, October 2000

Cape & Islands

Annual Progress Report Comprehensive Economic Development Strategy (CEDS) for Barnstable County (Cape Cod), Massachusetts 2001
Cape Cod Commission, CEDS Committee, Cape Cod Economic Development Council, CEDS Advisory Committee, June 2001

Central

The Greater Worcester Area Comprehensive Economic Development Strategy Committee Annual Report
Greater Worcester Area Comprehensive Economic Development Strategy Committee, 2001

Montachusett Region Comprehensive Economic Development Strategy
Montachusett Regional Planning Commission, December, 2001

Pioneer Valley

Data Digest – A Statistical Profile of the Pioneer Valley Region
Pioneer Valley Planning Commission

The Greater Franklin County Region Comprehensive Economic Development Strategy
Michael Bosworth, Stanley Gawle, and Samuel Lovejoy
Franklin Regional Council of Governments, June 2000

"Hidden Tech: On the Trail of the Pioneer Valley's Low-Profile High-Technology Community"
The Boston Globe Magazine, February 10, 2002

Pioneer Valley Comprehensive Economic Development Strategy (CEDS) – Annual Report
Pioneer Valley Planning Commission, June 2001

The Pioneer Valley Plan for Progress – Economic Strategies for the Region –
Pioneer Valley Planning Commission, September 1994

Regional Transportation Plan for the Pioneer Valley
Pioneer Valley Planning Commission, 2000 Update

State of the Pioneer Valley Region
Pioneer Valley Planning Commission, 2001

Valley Vision – The regional land use plans for the Pioneer Valley
Pioneer Valley Planning Commission, September 1997

Workforce Access in the Pioneer Valley
Pioneer Valley Planning Commission, July 2001

Berkshire

Comprehensive Economic Development Strategy for Berkshire County, Massachusetts
Berkshire Regional Planning Commission, March 2001

Technology Enterprise in Berkshire County: Economic Analysis
Steven Ellis and Rebecca Loveland
University of Massachusetts Donahue Institute, February 2002

Data Sources

Bureau of Economic Analysis U.S. Department of Commerce

Bureau of Labor Statistics, U.S. Department of Labor

Index of the Massachusetts Innovation Economy 2001
Massachusetts Technology Collaborative, 2001

Massachusetts Biotechnology Directory: A Guide to Companies, Careers and Education, Massachusetts
Biotechnology Council, 2000

Massachusetts Division of Employment and Training

Massachusetts Institute for Social and Economic Research

MoneyTree™ Survey
PricewaterhouseCoopers/Thompson Venture Economics/
National Venture Capital Association

The New England Economic Project

State Rankings, 2002: A Statistical View of the 50 States
Edited by Kathleen and Scott Morgan
Morgan and Quitno Press, 2002

New England Economic Indicators
Federal Reserve Bank of Boston

U.S. Census Bureau, U.S. Department of Commerce